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(54) **Title:** SYSTEM AND METHOD FOR MANAGING LIFECYCLE OF A TRANSACTION ITEM

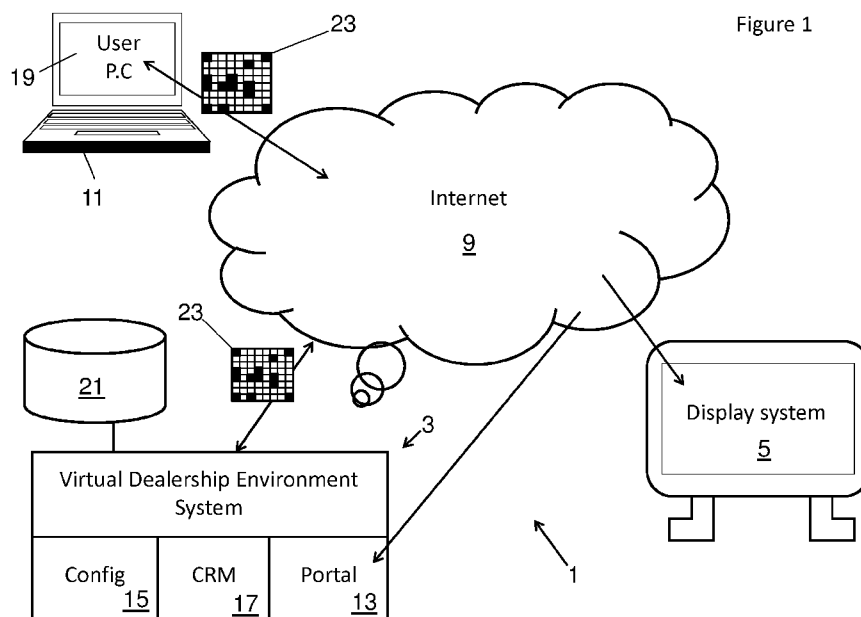


Figure 1

(57) **Abstract:** A method of managing the lifecycle of a transaction item, the transaction item having a number of user-configurable options, the method comprising: accessing a configurable transaction item; configuring the transaction item; receiving an information element, the information element being linked to the configured transaction element; scanning the information element to retrieve the configured transaction item; making a transaction to acquire the configured transaction item; updating a database with data related to the transaction and the information element.

SYSTEM AND METHOD FOR MANAGING LIFECYCLE OF A TRANSACTION ITEM**TECHNICAL FIELD**

The present invention relates to a system and method for managing the lifecycle of a transaction item. The present invention relates particularly, but not exclusively, to the lifecycle of a vehicle from initial selection through vehicle configuration to purchase and after-sales. Aspects of the invention relate to a server for managing the lifecycle of a transaction, and a transaction management system for managing the lifecycle of a transaction.

BACKGROUND

Prospective customers wishing to purchase a transaction item generally have one or more purchase routes available to them: purchase in a store, telephone order or online purchase via an online transaction platform (e.g. manufacturer's website). With the proliferation of high speed broadband internet connections many customers are favouring the online purchase route.

In some circumstances, particularly for large value purchases, a customer may initially research a transaction item online before visiting a retail outlet to either complete the transaction or to view the transaction item prior to an online purchase.

In some transaction environments the transaction item may comprise configurable elements and the online transaction platform that is available for the customer to use may allow these various configurable options to be displayed to the customer. For example, where the transaction item is a vehicle then the customer may have the option of exploring various configuration options relating to the vehicle they are interested in, e.g. paint colour and finish, interior trim options, exterior trim options etc. Any changes made while viewing the vehicle on the manufacturer's website may be represented via an online rendering of the vehicle that has been selected.

Although the ability to configure aspects of the vehicle may be provided to a customer on the online transaction platform, often the visual experience that is available to them is limited by the display and processing limitations of the device they are viewing the vehicle from. For example, if a customer visits an online vehicle configurator via a mobile device then there are likely to be processing and display limitations. Even if the customer visits the configurator from a home PC then there may be display limitations that mean that they do not receive a representative experience of the vehicle they are interested in.

Another method by which vehicle manufacturers may allow prospective customers to experience their range of vehicles is via a motorshow. However, such motorshows are expensive for the manufacturer to exhibit at and the foot-fall of potential customers at such a show only represents a small proportion of the potential market.

The lifecycle of a transaction item within the context of the discussion herein encompasses a user configuring a transaction item with various configuration options, through to making a transaction to acquiring the transaction item. As part of this lifecycle there may be further pre-transaction interactions between the initial configuration process and the acquisition of the transaction item. In some instances the lifecycle may extend beyond the transaction process. For example, some transaction items may not be immediately available at the point of the transaction item being acquired and so the lifecycle may extend into a "build" phase (e.g. where the transaction item is built to order, e.g. a new PC configuration or a new car configuration). The lifecycle may also extend to post-transaction services (e.g. maintenance and servicing functions).

It is an aim of the present invention to address disadvantages associated with the lifecycle of a transaction for a transaction item.

SUMMARY OF THE INVENTION

According to an aspect of the present invention, there is provided a method of managing the lifecycle of a transaction item, the transaction item having a number of user-configurable options, the method comprising: accessing a configurable transaction item; configuring the transaction item; receiving an information element, the information element being linked to the configured transaction element; scanning the information element to retrieve the configured transaction item; making a transaction to acquire the configured transaction item; updating a database with data related to the transaction and the information element.

According to this aspect of the present invention a method of managing the lifecycle of a configurable transaction item is disclosed from accessing the configurable item through to making a transaction. An information element (such as a QR code, barcode or other optical content) is used to link to the configured transaction item so that selected configuration options may be later retrieved (e.g. where the transaction item may be configured by selecting between one or more configuration options, the selected options may be stored and linked to the information element for later retrieval). Once a transaction has been made

a database that is used to store the information element and selected configuration options is updated.

5 The information element may later be used to access post-transaction services, such as booking servicing or maintenance sessions related to the transaction item. This may comprise re-scanning the code to access such post-transaction services.

10 A user may access the configurable item via a suitable computing device in order to connect via a communications network to a transaction management system. The user may then configure the configurable item on the transaction management system by interacting with their computing device. The transaction management system may generate an information element comprising, for example, user related data and configuration options that the user has selected for the configuration item. The information element may subsequently be scanned at a scanning device (scanner) associated with, or part of, the transaction management system such that the user's details and configuration options can be retrieved, from, for example a database associated with, or part of, the management system. The user may then complete a transaction for the item with the transaction management system and the transaction details may be used to update a database with data related to the information element and the transaction. The database may be the same database that the user's details and configuration options are stored in.

The information element may be in the form of optical content. For example, any one of: any one of: a barcode; a glyph; a dynamic optical encoding of content.

25 The information element may be displayed to an image capture device (such as a barcode scanner or camera device) to allow scanning. Displaying the information element to an image capture device may comprise displaying the information element on a display screen. For example, where a user configures a transaction item in accordance with an embodiment according to the present aspect of the invention the user may be sent, via suitable communication mechanism, the information element for display on a mobile computing device associated with that user. In such an embodiment the display screen that displays the information element may be the display device of the mobile computing device. The mobile computing device may be a so-called smartphone (such as an iPhone® or an Android®/Windows®/Blackberry® equivalent device) or a tablet computing device (such as an iPad® or equivalent device).

The method may further comprise rendering a simulation of the configured transaction item on a first display device. Such a simulation may be an interactive three dimensional simulation of the configured transaction item that may be capable of being manipulated by a user. For example, the first display device may comprise a large display screen which is
5 linked to a gesture control mechanism (such as the Kinect® system from Microsoft®) and a user may be able to rotate, zoom and interact with the simulation via suitable movements and gestures that are captured by the control mechanism.

The first display device may be a display device associated with a display or computing
10 device owned or controlled by a user. Alternatively, a third party may provide the first display device. In one illustrative example, the transaction item may be a vehicle and the first display device may be a display screen of sufficient dimensions to display the vehicle at substantially life-sized dimensions. The display device in this example may be owned by a vehicle manufacturer or dealership and may be located within a traditional vehicle dealership
15 location or elsewhere, such as a shopping mall or airport.

The method of the present invention may further comprise displaying a representation of the simulation on a second display device and may also comprise interacting, on the second display device, with the representation of the simulation. The second display device may be
20 part of a mobile computing device, such as a tablet computer and the method may comprise either reproducing the simulation from the first display on the second display (such that another user or users may interact with the simulation at the same time as a first user who is using the first display device) or showing a representation of the simulated object from the first display device (e.g. an alternate view, an overlay showing additional details about the
25 transaction item, an augmented reality view of the image shown on the first display device etc.).

The method may further comprise making further configuration choices relating to the already configured transaction item after receiving the information element. The act of further
30 configuring the configured transaction item may comprise displaying configuration options on a further display device. In certain embodiments of the present invention there may therefore be three display devices that users can interact with: a first display device that displays a simulation of the transaction item, a second display device in the form of a mobile computing device and a third, configuration display device for making further adjustments to the
35 selected configuration options.

In the event that the lifecycle of the transaction item is managed after a transaction has been made, the method may comprise accessing post-transaction services to schedule a service inspection for the acquired transaction item. Where making a transaction to acquire the transaction item comprises a delivery period, then scanning the information element during
5 the delivery period may display a current build status of the transaction item to a user. The method may also comprise rendering a simulation of the current build status of the transaction item.

A customer relationship management (CRM) means may be used to generate the
10 information element. The CRM means may be arranged to store user details and to associate user details and the generated information element with the configuration options selected by the user for the configurable transaction item.

The transaction item may be a vehicle.

According to another aspect of the present invention, there is provided a server for
15 managing the lifecycle of a transaction related to a transaction item, the transaction item having a number of user-configurable options, the server comprising: a data store for storing details of transaction items and configuration options for transaction items; portal means for
20 receiving data related to user selected configuration options; a configuration module arranged to configure the transaction item in response to the data received from the user at the portal means; a customer relationship management module arranged to generate an information element for sending to a user, the information element being arranged to be linked user selected configuration options for a transaction item and user details; wherein the
25 portal means is further arranged to receive requests to retrieve user-selected configuration options for a configured transaction item from the database and to send the user-selected configuration options to a display system.

According to a further aspect of the present invention, there is provided a transaction
30 management system comprising a server according to the above aspect of the present invention and a display system arranged to render a simulation of the configured transaction item on a first display device

The invention extends to a carrier medium for carrying a computer readable code for
35 controlling a server to carry out the method of the first aspect of the invention.

Within the scope of this application it is expressly envisaged that the various aspects, embodiments, examples and alternatives set out in the preceding paragraphs, in the claims and/or in the following description and drawings, and in particular the individual features thereof, may be taken independently or in any combination. Features described in connection with one embodiment are applicable to all embodiments, unless such features are incompatible.

BRIEF DESCRIPTION OF THE DRAWINGS

One or more embodiments of the invention will now be described, by way of example only, with reference to the accompanying drawings, in which:

Figure 1 shows an overview of the architecture of a transaction management system in accordance with an embodiment of the present invention;

Figure 2 is a flow chart of the lifecycle of a transaction in accordance with another embodiment of the present invention;

Figure 3 shows the elements of a system component of Figure 1 in greater detail;

Figure 4 is a flow chart of the process of interacting with elements of the component shown in Figure 3

Figure 5 shows a user interacting with components of the system shown in Figure 3;

Figure 6 shows two users interacting with components of the system shown in Figure 3;

Figures 7 to 10 show various embodiments in which a second display device interacts with a first display device of Figure 3;

Figure 11 shows a display system in accordance with an embodiment of the present invention;

Figure 12 shows examples of an information element according to an embodiment of the present invention being read by an element of the system component shown in Figure 3;

Figure 13 shows information elements in accordance with a further embodiment of the present invention;

Figure 14 is a flow chart showing the process of manipulating an information element in accordance with embodiments of the present invention;

- 5 Figure 15 shows an information element in accordance with a still further embodiment of the present invention;

Figure 16 and 17 show an information element according to an embodiment of the present invention as displayed by a mobile computing device;

10

Figure 18 shows an information element according to an embodiment of the present invention being partially obscured.

DETAILED DESCRIPTION

- 15 Turning to Figure 1 a transaction management system 1 in accordance with an embodiment of the present invention is shown. The transaction management system 1 comprises a transaction server 3 and a display system 5.

20 As shown in Figure 1, the server 3 and display system 5 are located remotely from one another and are in communication with one another via the internet 9 (or any another suitable communications network, e.g. a bespoke communications network or a mobile communications based network). It is however noted that the server 3 and display system 5 could be co-located at the same physical location.

- 25 As well as being in communication with the display system 5, the server 3 may also be accessed by users at a user computing device 11 (such as a PC, smartphone, laptop or any other suitable computing device). For the sake of clarity only one user computing device is shown in Figure 1 although it is to be appreciated that a plurality of such computing devices may interact with the server 3 at any given time.

30

The server further comprises a portal means 13 in the form of a portal module through which a user at the computing device 11 may interact with the server 3 (and through which the server 3 may interact with the display system 5), configuration means 15 in the form of a configuration module and customer relationship management (CRM) means 17 in the form of a customer relationship management module.

35

In use, the server may be arranged to output data (via the portal means 13) to the computing device 11 to allow a visual representation of a transaction item to be displayed on a display screen 19 of the computing device. The user may configure the transaction item to display various different configuration options and the configuration means 15 is arranged to
5 manage the configuration process.

Any user related data entered during the user's interaction with the server 3 may be recorded and captured within a CRM means 17 and stored within a database 21. Database 21 may also store details of the various transaction items that the user can access along
10 with each items potential configuration settings/options.

Also, shown in Figure 1 is an information element 23 in accordance with embodiments of the present invention, the operation of which is described in detail below. The information element is shown being supplied to the user's computing device 11. It is also noted that the
15 information element 23 and/or the visual representation of the transaction item may also be sent to the display system 5 as described in greater detail below.

The transaction management system 1 may be used to manage the lifecycle of a transaction made by a user. The lifecycle management process is depicted in Figure 2 which is
20 described with further reference to Figure 1.

In Step 201 a user at a computing device 11 connects to the transaction management system 1 and in particular the server 3 via the portal means 13 and the internet 9 and accesses a configurable transaction item. In one embodiment of the present invention the
25 transaction item may be a vehicle and the accessing of a configurable transaction item may comprise choosing a vehicle model.

In Step 203 the user interacts with the configuration means 15 to configure the transaction item. The configuration options may relate to configurable elements on the selected vehicle,
30 e.g. paint colour and finish, interior and exterior trim options etc. As different configuration options are selected the server 3 may output an updated representation of the transaction item for display on the display screen 19 of the computing device 11.

Once the user has configured the transaction item the server 3 stores the configured transaction item, e.g. in the database 21, to allow later retrieval and generates an
35 information element 23 in step 205 that is linked to the configured transaction item data. The information element 23 may be in the form of an optical representation, examples of which

may be a barcode, such as a two-dimensional barcode, QR code, glyph or a dynamic optical encoding of content. The CRM means 17 may be arranged to generate the information element and to manage the link between the information element 23, configured transaction item and user details may be managed by the CRM means 17. The data associated with the configured transaction item that is stored in the database 21 comprises the transaction item selected by the user and the user selected configuration options relating to that transaction item.

Once the configured transaction item has been linked to the information element the user is able to retrieve the configuration settings (the selected user configuration options) for the transaction element at a later point in time, in step 207, by scanning the information element. For example, where the information element comprises an optical information element, the action of scanning may comprise placing the information element in the field of view of a camera or scanning with a barcode reader. In the example of an information element that is encoded in an near-field communication device the action of scanning may comprise bringing an NFC reader into close proximity with the NFC device that stores the information element.

Having scanned the information element 23 the configuration settings for the transaction item may be retrieved at a point of sale system from the database 21/CRM means 17 on the server 3 and the user may make a transaction to acquire the transaction item (step 209). In more detail, the data from the scanned information element 23 is received at the portal means 13 and passed to the CRM means 17 which can retrieve the selected configuration options for the transaction element 23 from the database 21.

Although not shown in Figure 2 it is noted that a security check/validation step may be incorporated within the process flow of Figure 2 (for example within either step 209 or 211) in which a user identification process is triggered and possibly a credit check. For example, a user may be required to scan an identification item (such as a driving licence) as part of the scanning step 207 in order to retrieve their configuration options. A credit check step may also be initiated, especially for high value transaction items, in which a user's ability to acquire the transaction item is determined and verified. This may be an automated credit check or may involve interaction with a human operator (who may be remotely located at, for example, a call centre). As well as determining the user's ability to acquire the transaction item such a credit check may also prevent a user from inadvertently acquiring a transaction item by accidentally selecting a purchase option.

In Step 211 the database 21 is updated (via the CRM means 17) with details of the transaction. For the user in question the database now stores details of a unique information element for that user, and the transaction item such as the vehicle model and configuration settings for that vehicle and details of the transaction.

5

In Step 213 the information element may be used to access post-transaction services. For the vehicle transaction example this may comprise scanning the information element again to receive details of the progress of the vehicle build or to access servicing or maintenance options (e.g. the transaction element could be scanned and the user presented with the option of booking a regular service).

10

Figure 3 shows a system component of the transaction management system 1 of Figure 1 in more detail. In particular, Figure 3 shows the display system 5 of Figure 1 in greater detail. It can be seen that the display system comprises a display server 25 which includes a means for rendering 27 in the form of a render processor. The display server is also in communication with a first display device 29, a first input device 31, second display devices 33 (which are represented in the figure by a portable tablet computing device such as an iPad® but which may be any suitable computing device such as a laptop, PC etc.) and a further display device 35 and further input device 37.

15

20

The display system 5 also includes an image capture device 39, such as a camera or barcode scanner, an audio output device 41, such as a loudspeaker or arrangement of speakers, and a data store 43.

25

The display system 5 shown in Figures 1 and 3 is in communication with the server 3 and may receive from the server 3 data relating to the transaction item that the user has configured according to the process of Figure 2 above. Such data may comprise information to allow the render processor 27 to render a simulation/representation of the transaction item for display on the first display device 29 and/or the second display devices 33.

30

It is noted that the simulation of the transaction item that is displayed on the first display device 29 may be manipulated via the first input device 31. Suitable input devices include touchpads (which may be embedded within the display screen of the first display device or which may be a standalone input device in communication with the render processor 27), gesture recognition input devices (such as the Microsoft Kinect® system), speech recognition input devices, keyboard and mouse input devices etc.

35

It is also noted that the second display devices 33 may also allow manipulation of the representation of the transaction item that is displayed, e.g. in the case of a tablet computing device the input may be received via a touchscreen.

5 According to embodiments of the present invention, the display system 5 represents a location a user visits to interact with a computer generated simulation of the transaction item that they have configured according to the process depicted in Figure 2. For example, the display system 5 may represent an actual or a “virtual” car dealership where the user can view and interact with a near life-size rendering of the transaction item that they have
10 configured.

The display system 5 may be located in the same physical location that the transaction item would normally be purchased from (e.g. it may be located in a car showroom, an actual car dealership) or alternatively it may be located in another environment (e.g. shopping mall,
15 airport departure lounge etc., a “virtual” car dealership).

The display system 5 affords the user the opportunity to see a rendering, prior to purchase, of their selected and configured transaction item on a display device with superior display functionality than the computing device 11 that they started the transaction lifecycle upon.
20

In embodiments of the invention the first display device 29 may comprise a high definition screen of sufficient dimensions to be able to display the transaction item on substantially life-size scale.

25 As noted above the transaction item may be configured by the user from the computing device 11 and data relating to the configured transaction item may be stored in the database 21. The display server 25 may retrieve this data using the information element 23 that is provided to the user at the end of the configuration process.

30 The information element 23 may be scanned by the image capture device 39 and the display server 25 may use the information encoded within the information element to contact the server 3 and request details of the transaction item that the user is interested in and the configuration settings/options for that item. Depending on the particular embodiment of the invention the information element may represent a unique identification code that is linked at
35 the server 3 side to the user and their configured transaction item. Alternatively, the information element may encode user data, transaction item data and configuration options data.

Prior to displaying a render of the transaction item on the first display device 29 or second display devices 33 the user may be able to fine tune the configuration of the transaction item via a further display device 35 and further input device 37. In one embodiment the first display device 29 and further display device 35 may be of similar dimensions to one another and be located side by side such that updates to the configuration of the transaction item can be "moved" from the further display device 35 to the high definition render of the transaction item on the first display device 29. In embodiments where the further input device 37 is a touchscreen within the further display device 35 then the "movement" of the updated configured transaction item may comprise the user "swiping" the updated configured transaction item across from the further display 35 to the first display device 29.

The audio output 41 may be used to simulate a sound environment normally associated with the transaction item. For example, where the transaction item is a vehicle then the sounds may comprise simulated traffic noise or muffled traffic noise if the interior of the vehicle is being displayed.

Figure 4 is a flow chart of the process of interacting with elements of the system component (display system 5) shown in Figure 3.

In Step 221 a simulation of the transaction item (i.e. the object to be simulated) is generated by the render processor 27. In the embodiment depicted in Figure 3 the rendering means 27 is located within the display system 5. In alternative embodiments the rendering means may be located remote from the display system, for example in the server 3.

In step 223 the simulation is displayed on the first display device 29 and in step 225 the user may interact with the simulation shown on the first display device 29.

The simulation that is generated and rendered by the rendering means 27 may be a 3D simulation of the transaction item which is arranged to react to input from the input device 31 to simulate real world interactions with the transaction item (for example the vehicle orientation may be changed by moving relative to the first display device 29. The relative size of the simulated object may also be changed by moving further away from or closer to the first display device 29). In the example of a vehicle as the transaction item the simulation may respond to user input such that doors on the vehicle may be opened and closed within the simulation. The user may also be able to change the view provided on the first display device 29 such that the point of view of the simulation changes from an outside view of the

vehicle to an inside view. The user may also interact with controls within the cockpit of the vehicle within the context of the simulation.

In Step 227 the user or another user may capture a representation of the simulation on the first display device 29 for display on a second display device 33 and in Step 229 the representation of the simulation may be displayed on the second display device 33. In Step 231 the user (or the other user) may interact with the representation of the simulation on the second display device 33.

The second display device 33 may comprise an image capture device of its own, e.g. a built in camera, to enable a representation of the simulation on the first display device to be captured (see, for example, feature 63 in Figure 6). The process of capturing the representation may comprise taking a photograph of the first display device using the second display device. The captured representation may then be manipulated on the second display device.

In step 225 (as described above) the user may interact with the simulation on the first display device 29. Figure 5 shows an example of such interaction.

Figure 5 shows a sequence of five views (29a to 29e) of the first display device 29 over time. The first image in the sequence is at the top left of the figure and the final image in the sequence is at bottom right. The input device 31 for the first display device is shown above the display and, in the example shown, comprises a Kinect® style control device. The user 45 may therefore interact with the on-screen representation of the transaction item via a gesture control mechanism.

In the first view 29a in the sequence the display device 29 is showing a side view of a vehicle (the vehicle, in this context, representing the user configured transaction item 46). A first gesture 47 by the user 45 causes the image of the vehicle to rotate so that a rear view is shown, the second view 29b in the sequence. The user 45 then repeats the first gesture 47 to rotate the vehicle again so that a perspective side view is shown in view 29c.

As noted above the simulation is rendered such that real world interactions with the rendered object may be made. In view 29c some interaction prompt symbols 49 have been overlaid on the simulated object to indicate to the user 45 that they may interact with simulation in some way. In the present example the symbols 49 are located over the vehicle doors to indicate to the user 45 that the doors of the vehicle may be opened.

The user 45 then performs a second gesture 51 which causes the doors of the vehicle to open (view 29d). A further overlay symbol 53 has appeared in view 29d to indicate that the user may enter the vehicle within the context of the simulation. The user then performs a third gesture 55 to enter the vehicle within the simulation (view 29e).

Although the embodiment shown in Figure 5 uses gesture controls, specifically arm movements of the user 45, to control the simulation on the first display device 29 it is to be appreciated that other control commands may be used and alternative control devices may be used.

For example, where a gesture based input device 31 is used, the simulation of the transaction item may respond to the user 45 physically moving position. For example, movement towards the screen may bring the simulated object closer, movement to the left or right may initiate rotation of the device.

Alternative input devices may comprise a voice input device so that the simulation can be manipulated by voice command, a control device that incorporates one or more motion sensors, a separate touchpad for touch based input etc.

It is further noted that in alternative embodiments more than one input device type may be used to interact with the simulated object, e.g. a combination of gesture control as shown in Figure 5 plus vocal control could be used such that the transition between views 29c and 29d could be accomplished by speaking the command "open doors" instead of performing gesture 51.

Steps 227 to 231 above describe how a second display device 33 may capture a representation of the simulated object from the first display device 29 and display that on the second display device 33 such that the user or a further user may interact with the representation.

Figure 6 shows an embodiment in which a second display device 33 is used by a further user 57.

Figure 6 shows the first user 45 in front of the first display device 29 and first input device 31. The first user 45 interacts with the simulated object on the first display device 29 via a series of gestures 47, 51, 55 as described in Figure 5.

As well as the simulated object, the first display device 29 in Figure 6 additionally displays a number of reference markers 59. In the embodiment shown in Figure 6 there are four cross shaped reference markers 59, one in each corner of the first display device 29. The reference markers 59 are used to enable a second display device 33 to locate the first display device 29 and the display of the simulated object 46 within the field of view 61 of an image capture means 63 (e.g. a camera) on the second display device 33. In the embodiment shown in Figure 6 the image capture means is provided by a rear facing camera 63 (as opposed to a front facing camera 65 which may be used to provide video calling functionality).

Although four cross shape reference markers 59 are shown in the embodiment of Figure 6 it is to be appreciated that the reference markers may take other shapes and may be located at different locations on the first display device 29 (e.g. centre top/bottom and halfway up left/right hand sides).

The reference markers may be visible to the user 57 or alternatively may be invisible to the user 57 but visible to the camera 63 and second display device 33. The reference markers 59 may be hidden within the main image on the first display device 29 by a suitable stenographic technique.

Once the second display device 33 has located the position of the first display device then a representation of the simulation on the first display device may be presented to user 57 on the second display device 33 as shown in Figure 6. In the event that the second display device comprises motion control sensors (e.g. gyroscope and/or accelerometers) then movement 67 of the second user 57 relative to the first display device may cause the representation of the simulation to move.

The second display device may also be arranged to allow the user 57 to take "snapshots" 69, 71 of the simulated object. As shown in the bottom right corner of Figure 6, the user 57 has taken snapshots of a vehicle wheel assembly(69) from the simulated vehicle and of a headlight assembly/array (71).

Having taken a snapshot, the second user 57 may interact independently with the feature shown in the snapshot. For example, where the snapshot is of the vehicle wheel then the user 57 may call up different wheel designs or data related to the wheel, e.g. tyre type. The

user 57 may also be able to alter the viewpoint shown in the snapshot by interacting with the second display device (e.g. via a touchscreen).

In the embodiment shown in Figure 6 user 57's interaction, on the second display device 33, with the representation of the simulation of the simulated object is independent of user 45's interaction with the simulation of the simulated object on the first display device 29.

Figures 7 and 8 show a further embodiment in which the reference markers 59 may be used to select the view on the second display device 33. In Figure 7 the first display device 29 is showing a front perspective view of a vehicle and the user 57 has directed the camera 63 of the second display device 33 at the lower lefthand reference marker 59. In response the second display device 33 is showing a rear view of the vehicle being simulated on the first display device 29.

In Figure 8 the user 57 is now directing the second display device 33 at the top left reference marker 59 and in response the second display device 33 is showing a bird's eye view of the vehicle.

It is noted that the view of the first display device 29 may be static or moving (e.g. because the first user 45 is interacting with the first display device 29) but recognition of the reference markers 59 by the second display device 33 launches pre-determined views of the simulated object or pre-determined functions or menus.

It is noted that, in this embodiment of the invention, the representation of the simulation that is shown on the second display device 33 may be generated by the render processor 27 and sent via a suitable communications channel (e.g. Wi-Fi® or Bluetooth®) to the second display means 33. In an alternative embodiment the second display device 33 may comprise a processor capable of generating the representation.

As well as operating in a "snapshot" mode or using the reference markers 59 to trigger functionality or views, the second display device 33 may, in a further embodiment, operate in an augmented reality mode as shown in Figures 9 and 10.

In Figure 9 the user 57 has directed the integrated camera 63 of the second display device at the first display device 29 such that a particular feature of the simulated object 46 is visible on the display screen of the second display device 33. In the embodiment shown in Figure 9,

the first display device 29 is showing a front perspective view of a vehicle and the user 57 is holding the second display device 33 in their line of sight to the first display device.

5 The camera 63 (not shown in Figure 9) of the second display device 33 captures the simulation shown on the first display device 29 and the second display device 33 shows the vehicle from the same point of view as the first display device 29. As shown in Figure 9 the user's line of sight is to the wheel of the vehicle and the second display device 33 is showing a representation of the wheel visible on the first display device 29. The augmented reality mode of the second display device 33 then allows the user 57 to display different wheel
10 options. As shown in Figure 9 the wheel spoke design as shown on the first display device 29 is different to the wheel spoke design shown on the second display device 33.

In one embodiment of the present invention the user 57 may update the simulated object 46 on the first display device 29 by transferring the representation on the second display device
15 33 to the first display device 29. In one example, this may comprise swiping a pre-determined gesture on the screen of the second display device 33 or entering a particular command via the input interface on the second display device 33.

In Figure 10 the first display device 29 is showing an interior view of a vehicle. The camera
20 63 (not shown in Figure 10) of the second display device 33 has been trained on the gear stick shown on the first display device 29. As user 57 moves relative to the first display device 29, motion sensors within the second display device 33 detect this movement and adjust the view of the gear stick. In this manner the user 57 may change their point of view of the simulation shown on the first display device 29 and in the embodiment of Figure 10 this
25 allows the user 57 to effectively move around the gear stick so that they can view it from different angle.

Figure 11 shows an embodiment of the present invention which depicts an arrangement of a first display device 29, a number of second display devices 33 and a further display device
30 35.

It can be seen that the first display device 29 is displaying a simulation of a vehicle 46 which a user may interact with via the input device 31 located above the screen area of the first display device.

35 In this embodiment a further display device 35 is provided which displays the configuration options/settings selected by the user from their computing device 11 (not shown in in Figure

11) in steps 201 and 203 described above. These settings are retrieved from the server 3 upon presentation of an information element 23 in accordance with further embodiments of the present invention at the image capture device 39. The further display device 35 essentially comprises a large scale configuration screen which is touch enabled (input device 37) to allow the user to make further adjustments to their configuration settings before rendering the transaction item (vehicle) on the first display device 29 or to make further adjustments upon reviewing the simulation on the first display device 29.

In step 205 of Figure 2 above the server 3 generates an information element 23 that is linked to the user's details and also to the configured transaction item that the user has configured via their user computing device 11. Figure 12 shows a representation of one embodiment of an information element and further functionality of the information element is described in Figures 13 to 18.

The information element 23 shown in the embodiment depicted in Figure 12 is an 8-by-8 grid in which individual grid cells may be in a first state (black cell) or a second state (white cell). By varying the state of the various cells in the information element a unique identifying information element may be created. As described above, this unique information element 23 may, via the CRM means 17, be used to link user data (e.g. name, address, contact details etc.) to a transaction item and the user's selected configuration options.

Alternative embodiments of the information element may comprise: larger or small grids (e.g. a 16-by-16 grid or a 6-by-6 grid); QR codes; barcodes; glyphs; content that is dynamically encoded (e.g. a repeating sequence of images) or any other mechanism that is suitable to encode content that may then be later retrieved by scanning the information element.

As shown in Figure 13, the information element 23 that is generated by the server 3 may be sent to a user's mobile telecommunications device 73 or may be sent to the computing device 11 for printing as a paper document 75.

Once the user has received the information element 23 that is linked to their configured transaction item they may visit a location (such as a vehicle dealership) where the information element 23 is scanned (in step 207) by an image capture device 39 such that the user's details and data relating to their configured transaction item may be retrieved from the server 3. The information element may encode a user identifier or may also encode a unique reference locator (URL) address of the server 3.

In embodiments of the present invention the information element 23 may be constructed in such a way that obscuring parts of the information element 23 to the image capture device 39 may be used to trigger different functionality in a display system 5.

- 5 Figure 14 shows the process of using an information element 23 to trigger different functionality according to embodiments of the present invention.

In step 233 the information element 23 is presented to the image capture device 39 in order to be scanned to retrieve the data related to the information element. Scanning the
10 information element 23 in this manner allows the server 25 of the display system 5 to retrieve user data and configuration options data relating to the transaction item stored in the database 21 linked to the server 3. Having retrieved the data related to the information element the transaction item may be displayed, e.g. on the first display device 29 of the display system.

15

In step 235 the information element 23 is manipulated such that re-scanning the information element (in step 237 below) results in the image capture device 39 capturing a different representation or version of the information element.

- 20 Manipulating the information element 23 may comprise rotating the information element 23 relative to the orientation in which it was scanned in step 233. The server 25 may then detect the rotation of the element 23 when the element is scanned in step 237 below and trigger functionality based on the rotation type. To aid detection of rotation of the element 23 the information element 23 may be constructed such that it contains certain reference features
25 that the image capture device 39 and server 25 can detect. For example, the corner elements may be coloured or shaded differently to one another.

Manipulating the information element 23 may also comprise obscuring a part of the information element 23 such that there is a visible portion and an obscured portion of the
30 information element 23. Obscuring the information element 23 may be achieved simply by the user placing their hand over a portion of the information element 23 (either on the mobile telecommunications device 73 or on the printed document 75). Alternatively, a mask may be provided in order to obscure part of the information element 23. Where the information element 23 is displayed on a mobile device 73, the device 73 may be arranged to obscure
35 part of the element 23 by changing the on-screen representation of the information element 23 (as discussed in relation to Figure 16 below).

The description below is presented in the context of obscuring the information element 23 to trigger pre-determined functions. However, it is to be appreciated that embodiments of the present invention may additionally or alternatively use rotation of the information element 23 to trigger such functions.

5

In step 237 the partially obscured information element 23 is scanned again such that the image capture device only captures the visible portion of the element 23. A processor (e.g. the server 25) in communication with the image capture device 39 may then interpret the captured image and trigger a pre-determined function in dependence on the particular part of the information element that is visible (e.g. change view of the object on the first display device 29, change colour of simulated object on the first display device 29, open a menu on the first display device 29 or on the further display device 25 etc.).

Varying the part of the information element that is obscured, in step 239, may then be used to trigger different functionality. For example, obscuring different quadrants of the information element 23 shown in Figure 12 may be linked to different functionality. The user may trigger this functionality by obscuring a certain part of the information element 23 and then re-scanning the element 23 with the image capture device 39.

The image capture device 39 may be in communication with a computing device (e.g. the server 25) shown in Figure 3 which may be arranged to interpret the information element 23 and to interpret the information element 23 when only a part of the element is visible.

For example, upon scanning the full information element 23 in step 233 the computing device may retrieve or download data associated with the information element 23. The computing device may also at this time retrieve/download a series of partially obscured versions of the same information element each of which is linked with a particular function that the computing device could initiate in the event that the partially obscured information element is re-scanned. Since the computing device is downloading the relationship between the partially obscured versions and the functionality to be triggered on re-scanning the information element 23, this relationship may be altered between different users such that in one case obscuring the top left corner of the element might mean "change colour" and in another case might mean "show interior view".

In an alternative example, the computing device may be programmed such that obscuring a certain portion of an information element 23 results in the same functionality being triggered regardless of the actual information element being scanned.

As discussed in more detail below a single information element 23 associated with a particular user may be used to access multiple transaction items that the user has configured. Alternatively or additionally, the same information element 23 may be used to access multiple sets of configuration options that the user has configured.

Figure 15 shows the information element from Figure 12 but further indicates the different functionality that may be triggered by re-scanning the information element 23 with the image capture device 39.

In Figure 15 the information element is shown divided into four quadrants (77, 79, 81, 83) each of which is associated with a different function (Functions 1 – 4). The specific functionality is indicated next to each quadrant of the information element 23. In this manner a user is provided with instructions as to how to use the information element 23 to trigger different functionality.

Within the information element 23 shown in Figure 15, the cells of each quadrant may be provided with a different shading or colour scheme to provide a further visual indicator to a user of the different functionality that the element may be able to trigger. This is shown in Figure 15 via the circle, triangle, cross and star shading in the various quadrants. It is however noted that such shading/colour schemes would not be necessary for the information element 23 to be used to trigger different functionality. All that would be required would be to obscure parts of the element.

It is noted that, where a shading/colour scheme is used, the corner cells 85 of the information element 23 may all be left in a default colour/shading. This is to provide the image capture device 39 with an identifiable reference point in each quadrant so that the boundary of the information element 23 can be easily identified.

Figure 16 shows three views of a mobile telecommunications device 73 (devices 73a, 73b, 73c) which is displaying an information element 23 similar to that shown in Figure 15.

In the left-hand image of the device (device 73a), the information element 23 is located at the upper end of a display screen 87. The various functionality that the information element 23 may be used to trigger is indicated on the display screen 87, beneath the information element 23. As shown in the left hand image of Figure 16, two functions are represented (Functions 1 and 2) on the display screen 87 underneath the information element 23. Next to

each function is a representation (89, 91) of the information element 23 in which one of the quadrants of the element 23 has been obscured to indicate to the user of the device 73 how the information element 23 will be modified when a function is selected. It is noted that selecting one of the functions presented to the user on the display screen will change the on-screen representation of the information element 23 on the display screen 87. In the example of Figure 16, if the user touches the representation 89 then the display device 73 will change the onscreen representation of the information element 23 as described below.

In the middle image (device 73b) Function 1 has been selected. It can be seen that the upper left quadrant 77 of the information element 23 shown in the left-hand image of the device 73 has now been obscured on the screen 87. Underneath the information element 23 a confirmation of the selected function is provided to the user plus an instruction 93 to re-scan the element 23 with the image capture device 39.

In the right-hand image (device 73c), Function 2 has been selected. It can be seen that the upper right quadrant 79 of the information element 23 shown in the left-hand image of the device 73 has now been obscured on screen 87. Underneath the information element 23 a confirmation of the selected function is provided to the user plus an instruction 93 to re-scan the element 23 with the image capture device 39.

Upon re-scanning (step 237) the middle or right-hand images (devices 73b or 73c) the processor attached to the image capture device 39 would determine which part of the information element 23 had been obscured and then perform a specific function depending on a pre-determined relationship between the visible part of the information element and a set of functions.

Where the information element 23 is displayed on the display screen 87 of a computing device (e.g. the mobile device 73 of Figure 13), the display of the information element 23 may be managed by a computer program (e.g. a smartphone “app”) running on the device.

Figures 17 and 18 show two further mechanisms for interacting with an information element in accordance with further embodiments of the present invention.

In Figure 17 the image capture device 39 (not shown in Figure 17) is provided by a camera on the mobile telecommunications device 73. In use, the user may connect to the display system server 25 (e.g. via a Bluetooth® connection or via a Wi-Fi® or other suitable wireless connection) so that the captured image of the scanned information element 23 can be sent

to the server 25 for retrieval of the configured transaction item data. In Step 233 the mobile device 73 may be positioned over the information element 23 such that the entire element 23 is imaged by the camera. In Steps 235 and 237 the mobile device may be positioned, as shown in Figure 17, such that only a part of the information element 23 is visible to the camera of the device. In this manner the visible part of the information element may be varied (Step 237) so that different functionality may be triggered.

In Figure 18, the user's own hand 95 is used to obscure part of the information element 23.

Although the information element 23 is shown displayed on a user's mobile device 73 above it is to be appreciated that the information element may also be displayed on the second display device 33.

Further, although the image capture device 39 is described above as scanning the information element 23 it is to be appreciated that the image capture may take place via a camera device on the user's mobile device 73 (for example, in the event that the user has printed the information element 23 onto a paper document 75 then they may scan the element 23 with their own mobile device 73 which could be linked via a wireless communications signal such as Bluetooth® or Wi-Fi® to the display system 5/display server 25). The image capture may also take place via a camera device 63 on the second display device 33.

The functionality that is triggered by scanning the partially obscured information element 23 may include some or all of the following: changing the view of the object displayed on the first display device 29 (for example the user 45 could move through views 29a to 29e as shown in Figure 5 by re-scanning the partially obscured element 23); opening a menu list of commands (on either the second display device 33 or the user's own mobile device 73); changing a trim option (for example re-scanning the element 23 could change the selected vehicle wheel assembly option displayed on the rendered simulation on the first display device 29); changing the colour of the simulated object 46 (for example re-scanning the element 23 could enable the user to sample a colour using the image capture device on their mobile device 73 and the simulated object 46 could be re-rendered in this colour).

In the above description the user is described as configuring a single transaction item (i.e. a single vehicle in the example described) with a single set of configuration options. It is to be appreciated that the lifecycle management process described with reference to Figure 2 above may be arranged to allow the user to configure more than one set of configuration

options for a particular transaction item and furthermore may be arranged to allow the user to configure multiple transaction items. In the example of the transaction item being a vehicle the user may configure two entirely different models of vehicle which can then be viewed via the display system 5. Where multiple transaction items are configured the method according to embodiments of the present invention may also allow multiple sets of configuration options be chosen for each of the multiple transaction items selected by the user.

Where a user has either multiple sets of configuration options or multiple transaction items (or both) to view on the display system the user may once the information element 23 has been scanned display a list of configurations/transaction items for the user to choose from. It is noted in this example that the same information element 23 has been associated by the server 3/database 21 to all the various user selected items/configurations.

In a further embodiment, manipulating the information element 23, by either obscuring it or rotating it, before rescanning it or during rescanning it with the image capture device 39 may allow the user to access their various different configuration options or configured transaction items for display on the display system 5.

For ease of reference the various sections of the information element that can be obscured may be presented in a different visual manner to one another to aid the user. The different sections may be coloured differently or may be shaded differently. To provide a reference point to the image capture device some elements of the information element may be represented in the same manner across all sections of the information element. In Figure 15 it is noted that the corner elements are all shaded in black whereas the remaining shaded cells all take one of four shading schemes.

Embodiments of the invention will also be understood with reference to the following numbered paragraphs

1. A method of managing the lifecycle of a transaction item, the transaction item having a number of user-configurable options, the method comprising:
 - accessing a configurable transaction item;
 - configuring the transaction item;
 - receiving an information element, the information element being linked to the configured transaction element;
 - scanning the information element to retrieve the configured transaction item;
 - making a transaction to acquire the configured transaction item;

updating a database with data related to the transaction and the information element.

- 5 2. A method as set out in paragraph 1, further comprising using the information element to access post-transaction services.
3. A method as set out in paragraph 1, wherein the information element is in the form of optical content.
- 10 4. A method as set out in paragraph 3, wherein scanning the information element comprises displaying the information element to an image capture device to allow scanning.
- 15 5. A method as set out in paragraph 4, wherein displaying the information element to an image capture device comprises displaying the information element on a display screen of a mobile computing device.
- 20 6. A method as set out in paragraph 3, wherein the optical content is in the form of any one of: a barcode; a glyph; a dynamic optical encoding of content.
7. A method as set out in paragraph 1, further comprising rendering a simulation of the configured transaction item on a first display device.
- 25 8. A method as set out in paragraph 7, further comprising manipulating the simulation of the configured transaction item on the first display device.
9. A method as set out in paragraph 7, further comprising displaying a representation of the simulation on a second display device.
- 30 10. A method as set out in paragraph 9, further comprising interacting, on the second display device, with the representation of the simulation.
- 35 11. A method as set out in paragraph 10, wherein the second display device is part of a mobile computing device.

12. A method as set out in paragraph 1, further comprising further configuring the configured transaction item after receiving the information element.

13. A method as set out in paragraph 12, wherein further configuring the configured transaction item comprises displaying configuration options on a further display device (35).

14. A method as set out in paragraph 1, further using a customer relationship management (CRM) module to generate the information element.

15. A method as set out in paragraph 14, wherein the CRM module is arranged to store user details and to associate user details and the generated information element with the configuration options selected by the user for the configurable transaction item.

16. A method as set out in paragraph 1, further comprising validating a user identity, the validating step comprising an identification check and a credit check.

17. A method as set out in paragraph 1, wherein the transaction item is a vehicle.

18. A server for managing the lifecycle of a transaction item, the transaction item having a number of user-configurable options, the server comprising:

a data store for storing details of transaction items and configuration options for transaction items;

portal means for receiving data related to user selected configuration options;

a configuration module arranged to configure the transaction item in response to the data received from the user at the portal means;

a customer relationship management module arranged to generate an information element for sending to a user, the information element being arranged to be linked to the user selected configuration options for a transaction item and user details;

wherein the portal means is further arranged to receive requests to retrieve user-selected configuration options for a configured transaction item from the database and to send the user-selected configuration options to a display system.

19. A transaction management system for managing the lifecycle of a transaction comprising a server and a display system arranged to render a simulation of the configured transaction item on a first display device, the server comprising:

a data store for storing details of transaction items and configuration options for transaction items;

portal means for receiving data related to user selected configuration options;

5 a configuration module arranged to configure the transaction item in response to the data received from the user at the portal means;

a customer relationship management module arranged to generate an information element for sending to a user, the information element being arranged to be linked user selected configuration options for a transaction item and user details;

10 wherein the portal means is further arranged to receive requests to retrieve user-selected configuration options for a configured transaction item from the database and to send the user-selected configuration options to a display system.

20. A carrier medium for carrying a computer readable code for controlling a server to carry out the method of paragraph 1.

15

CLAIMS

1. A method of managing the lifecycle of a transaction item, the transaction item having a number of user-configurable options, the method comprising:
 - 5 accessing a configurable transaction item;
 - configuring the transaction item;
 - receiving an information element, the information element being linked to the configured transaction element;
 - scanning the information element to retrieve the configured transaction item;
 - 10 making a transaction to acquire the configured transaction item;
 - updating a database with data related to the transaction and the information element.
2. A method as claimed in Claim 1, wherein the information element is in the form of optical content.
- 15 3. A method as claimed in Claim 2, wherein scanning the information element comprises displaying the information element to an image capture device to allow scanning.
4. A method as claimed in Claim 3, wherein displaying the information element to an image capture device comprises displaying the information element on a display screen.
- 20 5. A method as claimed in Claim 4, wherein the display screen that displays the information element is the display device of a mobile computing device.
- 25 6. A method as claimed in any one of Claims 2 to 5, wherein the optical content is in the form of any one of: a barcode; a glyph; a dynamic optical encoding of content.
7. A method as claimed in any preceding claim, further comprising rendering a simulation of the configured transaction item on a first display device.
- 30 8. A method as claimed in Claim 7, wherein the simulation of the transaction item comprises a three dimensional simulation of the configured transaction item.
9. A method as claimed in Claim 7 or Claim 8, further comprising manipulating the simulation of the configured transaction item on the first display device.
- 35

10. A method as claimed in Claim 9, wherein manipulating the simulation comprises interacting with a gesture control input mechanism.
- 5 11. A method as claimed in any one of Claims 7 to 10, further comprising displaying a representation of the simulation on a second display device.
12. A method as claimed in Claim 11, further comprising interacting, on the second display device, with the representation of the simulation.
- 10 13. A method as claimed in Claim 11 or Claim 12, wherein the second display device is part of a mobile computing device.
14. A method as claimed in Claim 13, wherein the mobile computing device is a tablet computer.
- 15 15. A method as claimed in any preceding claim, further comprising further configuring the configured transaction item after receiving the information element.
16. A method as claimed in Claim 15, wherein further configuring the configured transaction item comprises displaying configuration options on a further display device (35).
- 20 17. A method as claimed in any preceding claim, further comprising using the information element to access post-transaction services.
- 25 18. A method as claimed in Claim 17, wherein accessing post-transaction services comprises scheduling a service inspection for the acquired transaction item.
19. A method as claimed in any preceding claim, wherein making a transaction to acquire the transaction item comprises a delivery period and scanning the information element during the delivery period displays a current build status of the transaction item to a user.
- 30 20. A method as claimed in Claim 19, further comprising rendering a simulation of the current build status of the transaction item.
- 35 21. A method as claimed in any preceding claim, further using a customer relationship management (CRM) means to generate the information element.

22. A method as claimed in Claim 21, wherein the CRM means is arranged to store user details and to associate user details and the generated information element with the configuration options selected by the user for the configurable transaction item.

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23. A method as claimed in any preceding claim, further comprising validating a user identity, the validating step comprising an identification check and a credit check.

24. A method as claimed in any preceding claim, wherein the transaction item is a vehicle.

10

25. A server for managing the lifecycle of a transaction item, the transaction item having a number of user-configurable options, the server comprising:

a data store for storing details of transaction items and configuration options for transaction items;

15

portal means for receiving data related to user selected configuration options;

a configuration module arranged to configure the transaction item in response to the data received from the user at the portal means;

a customer relationship management module arranged to generate an information element for sending to a user, the information element being arranged to be linked to the user selected configuration options for a transaction item and user details;

20

wherein the portal means is further arranged to receive requests to retrieve user-selected configuration options for a configured transaction item from the database and to send the user-selected configuration options to a display system.

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26. A transaction management system for managing the lifecycle of a transaction comprising a server according to Claim 25 and a display system arranged to render a simulation of the configured transaction item on a first display device.

27. A carrier medium for carrying a computer readable code for controlling a server to carry out the method of any one of Claims 1 to 22.

30

35

Figure 1

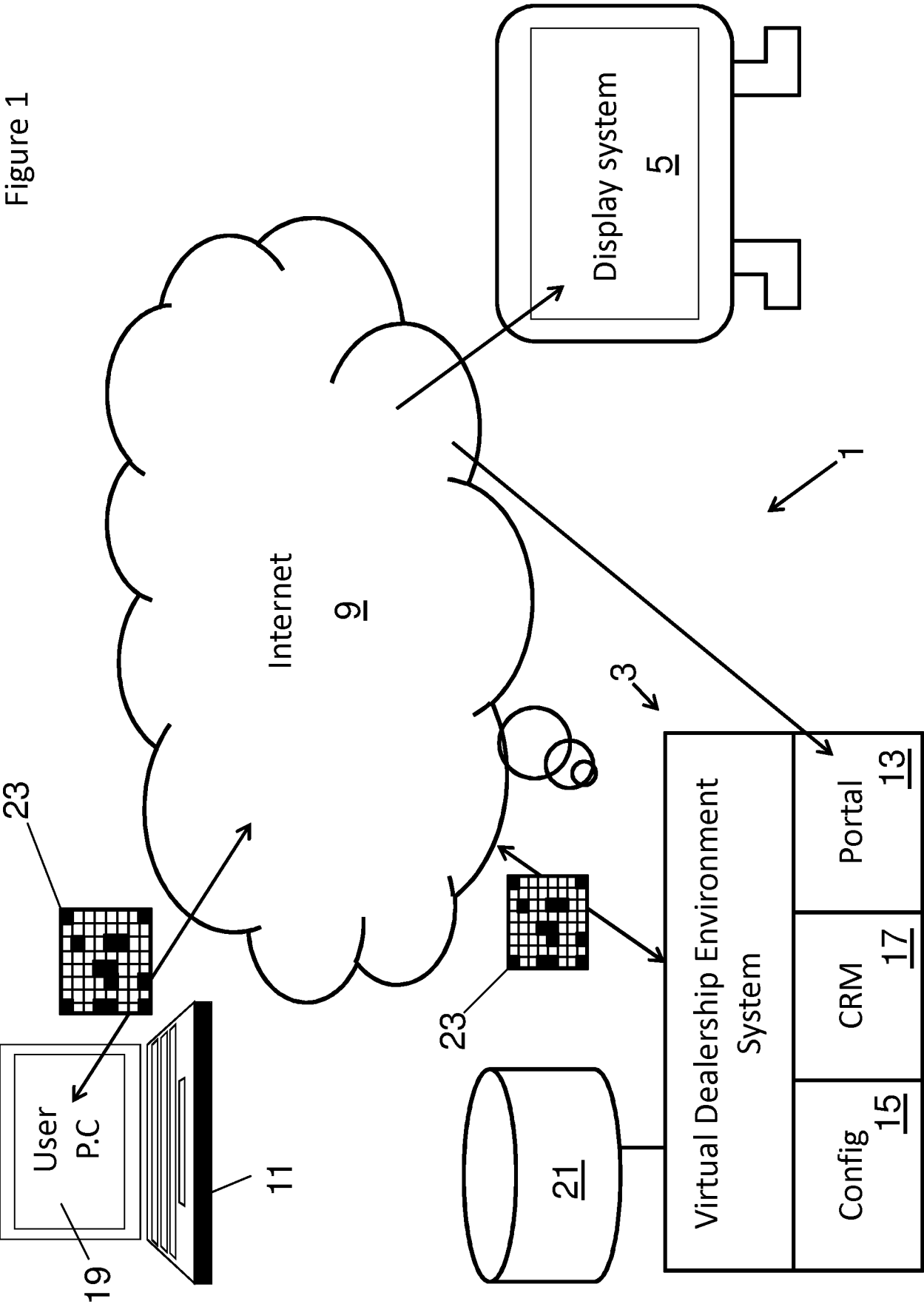
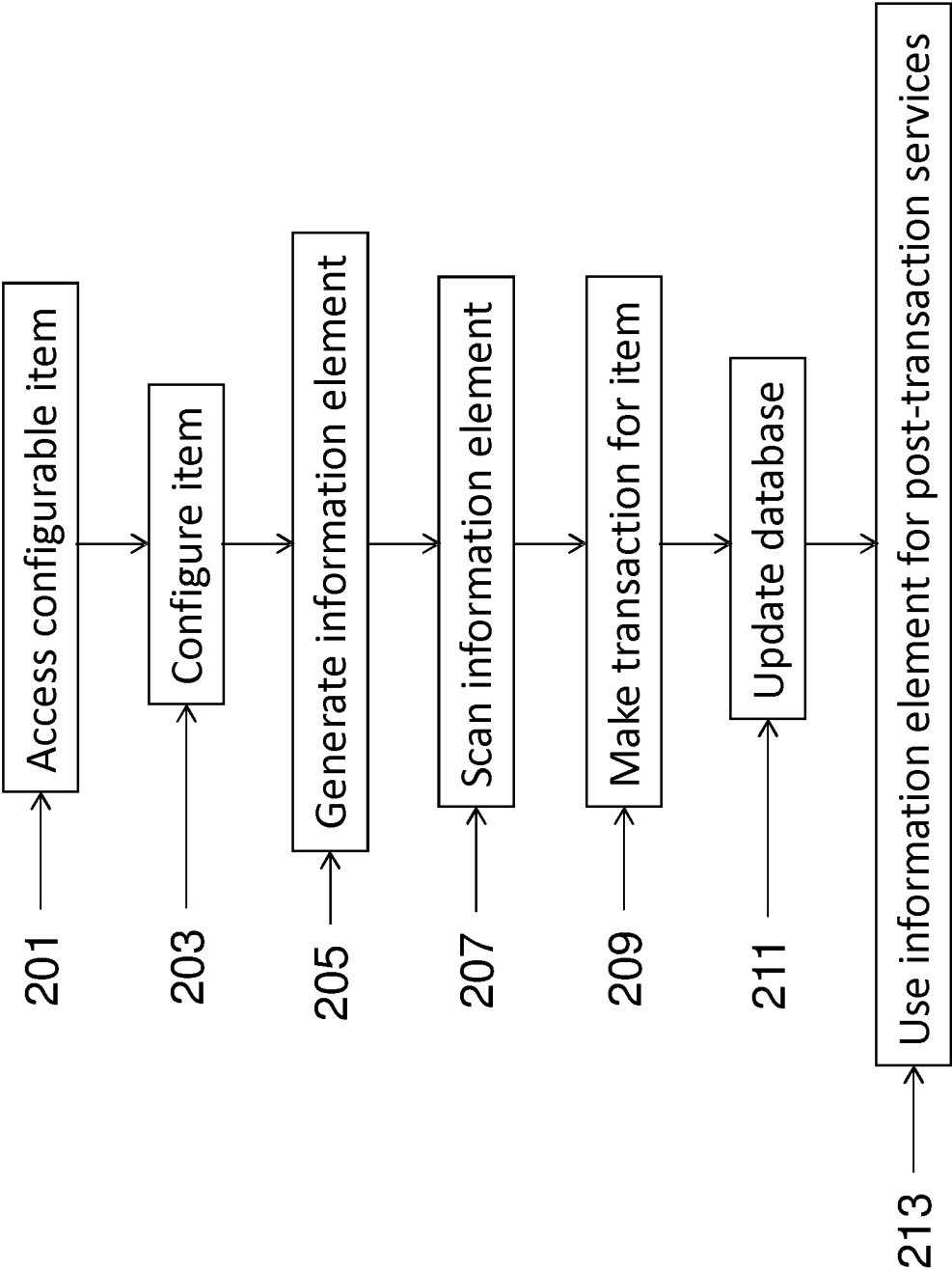


Figure 2



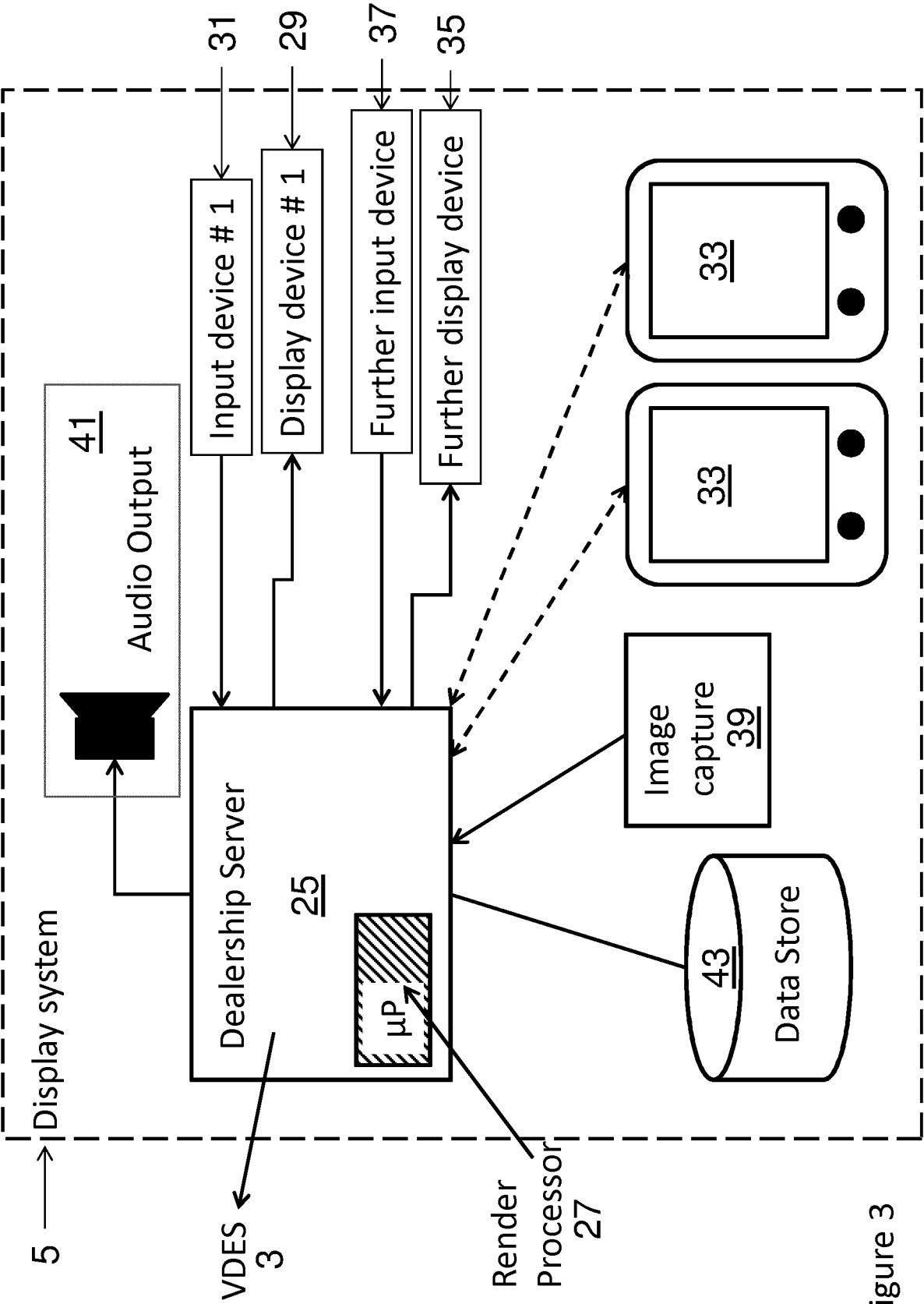
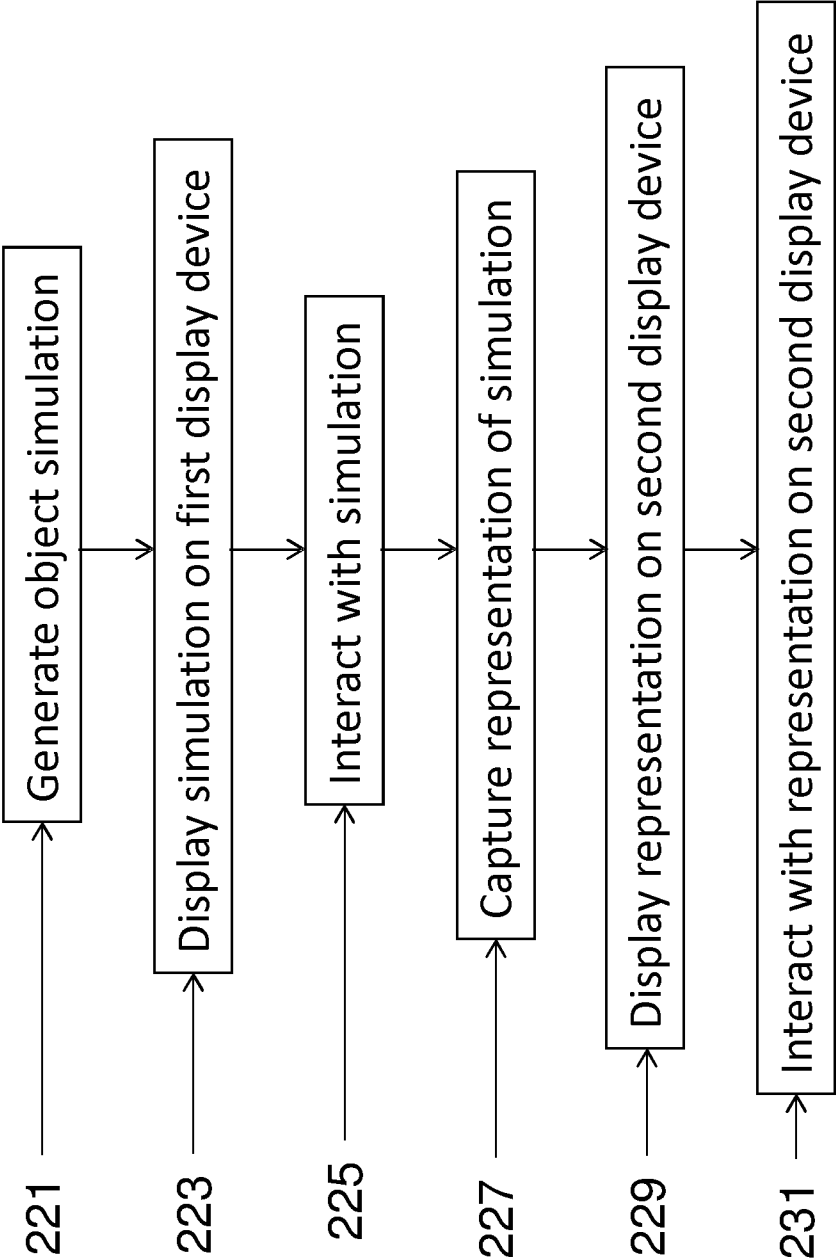


Figure 3

Figure 4



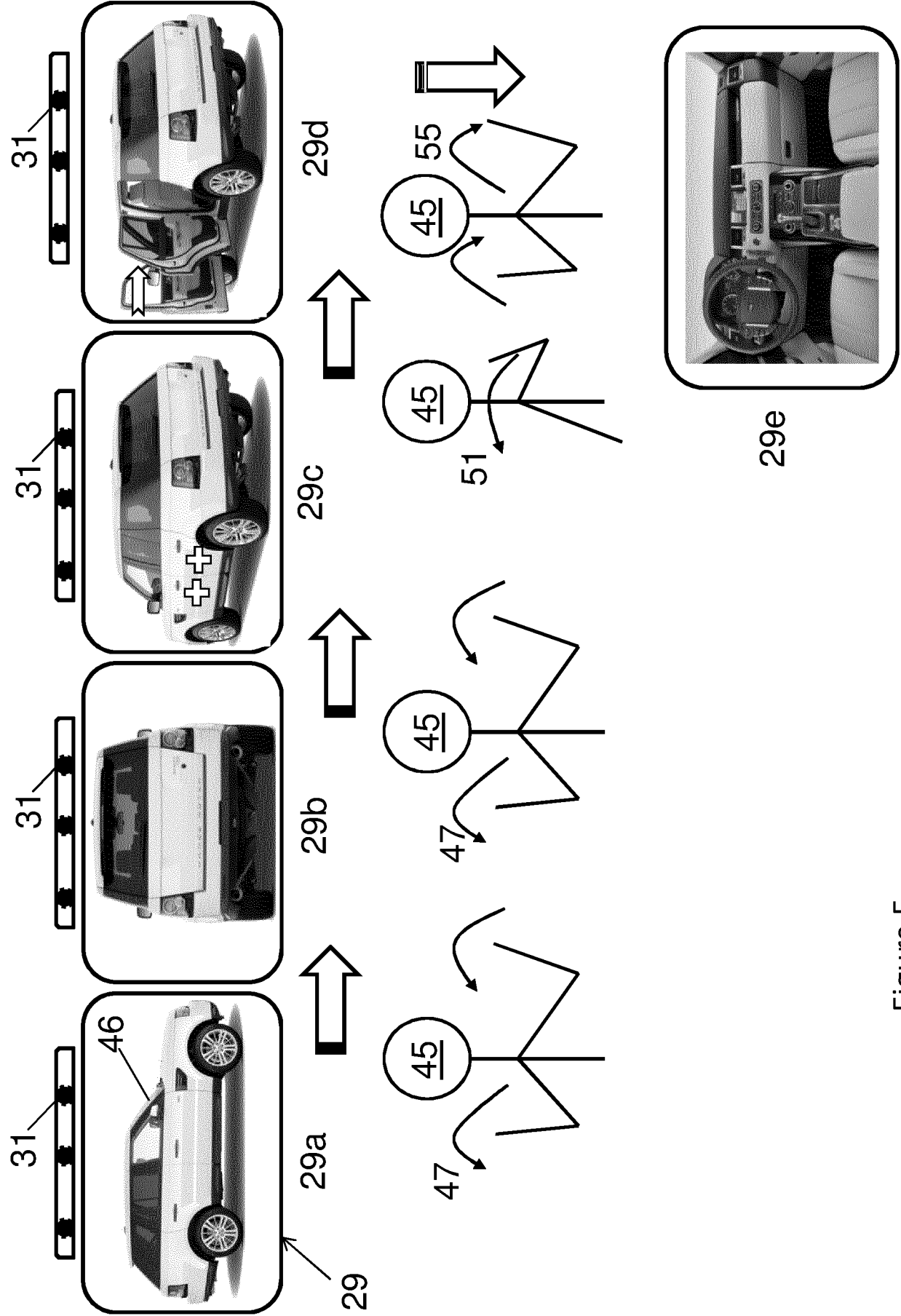


Figure 5

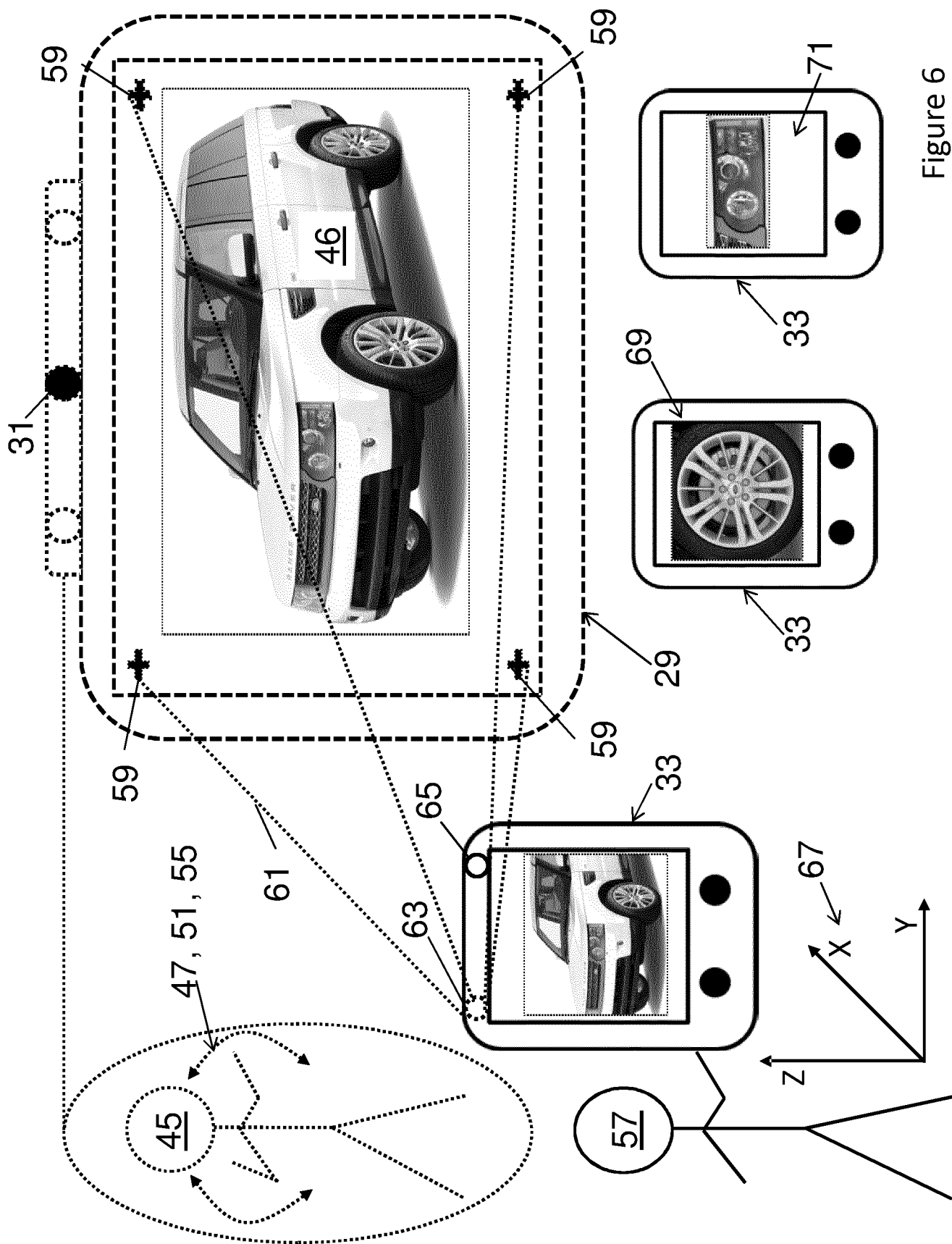
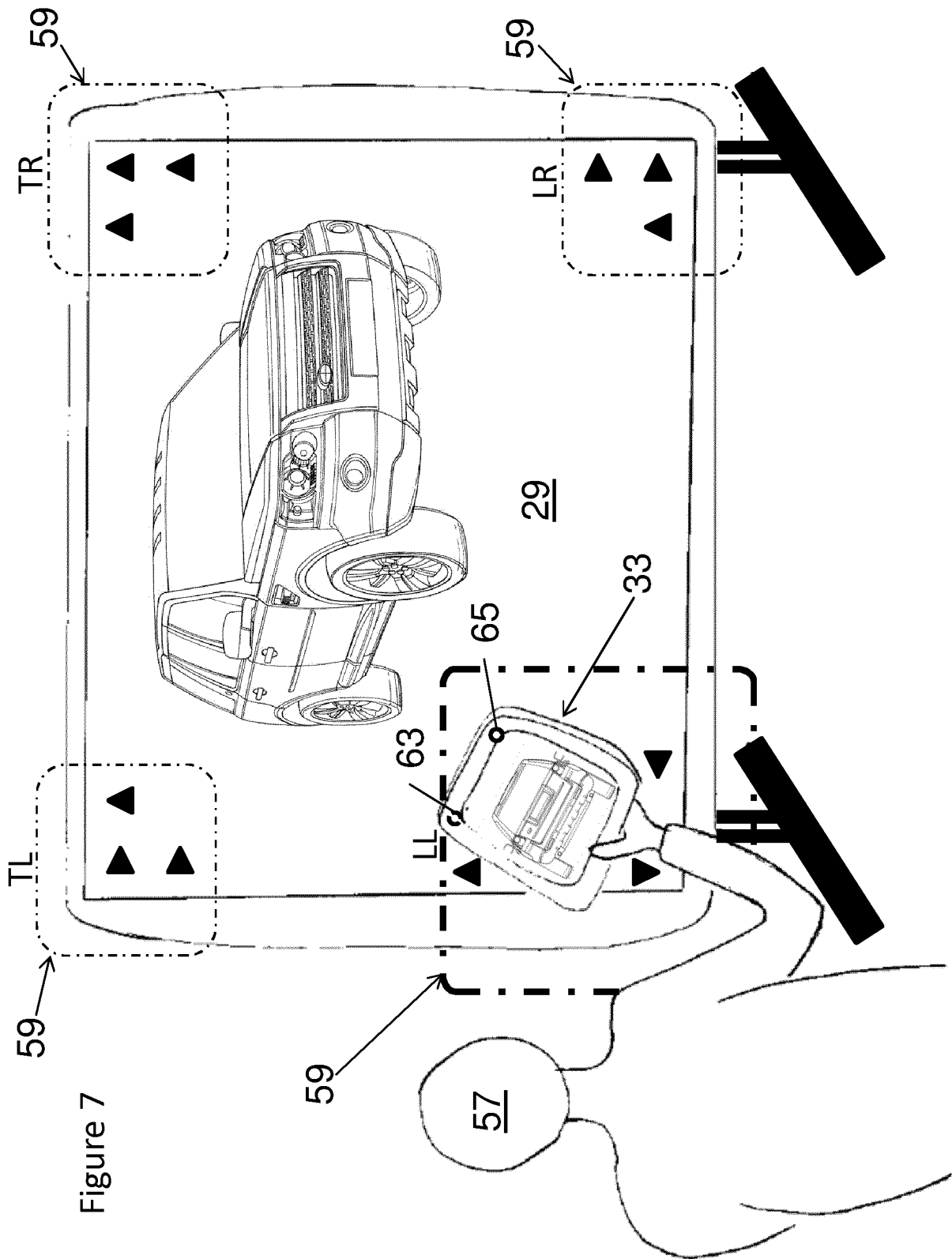


Figure 6



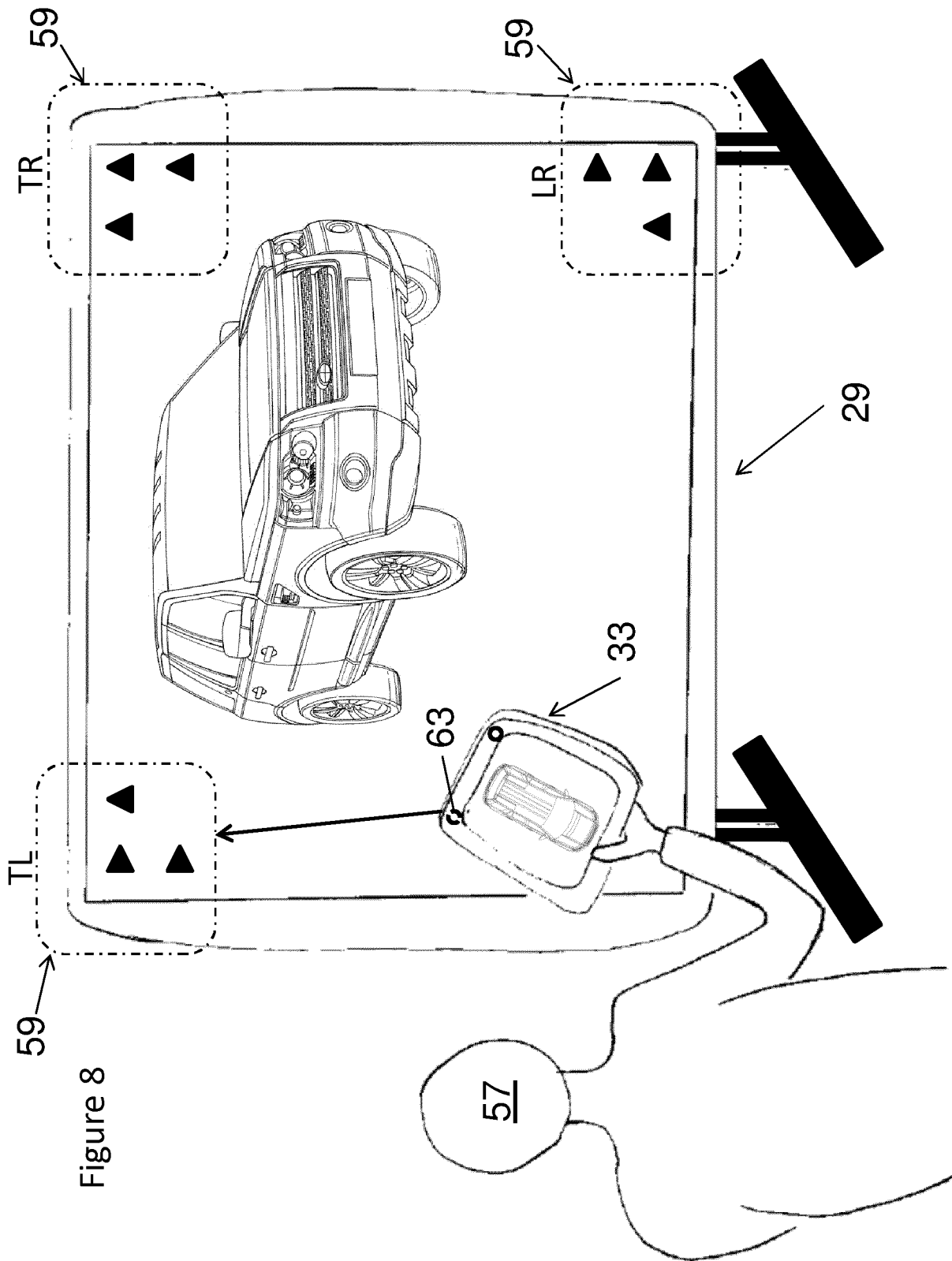


Figure 8

9/17

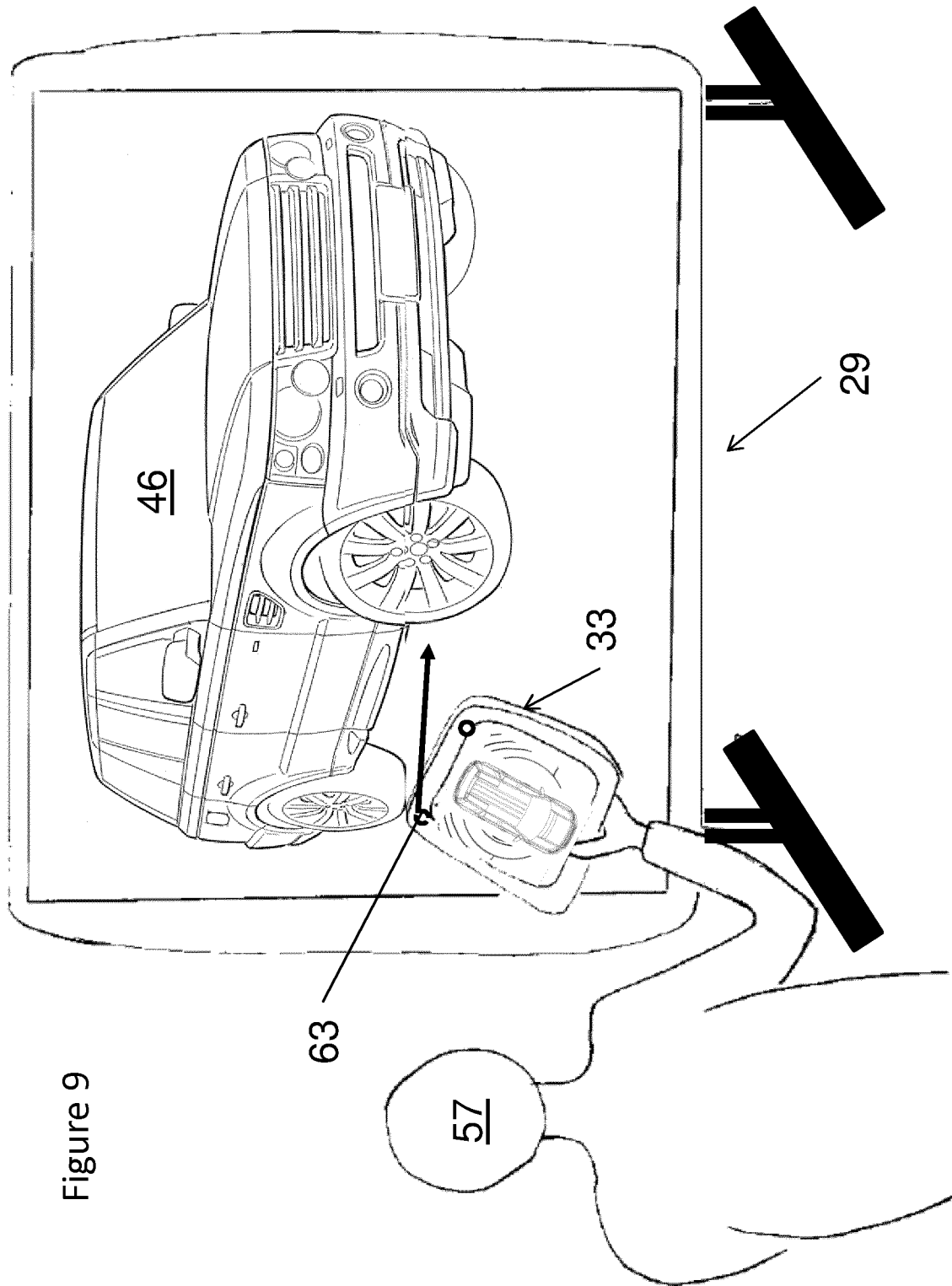


Figure 9

Figure 10

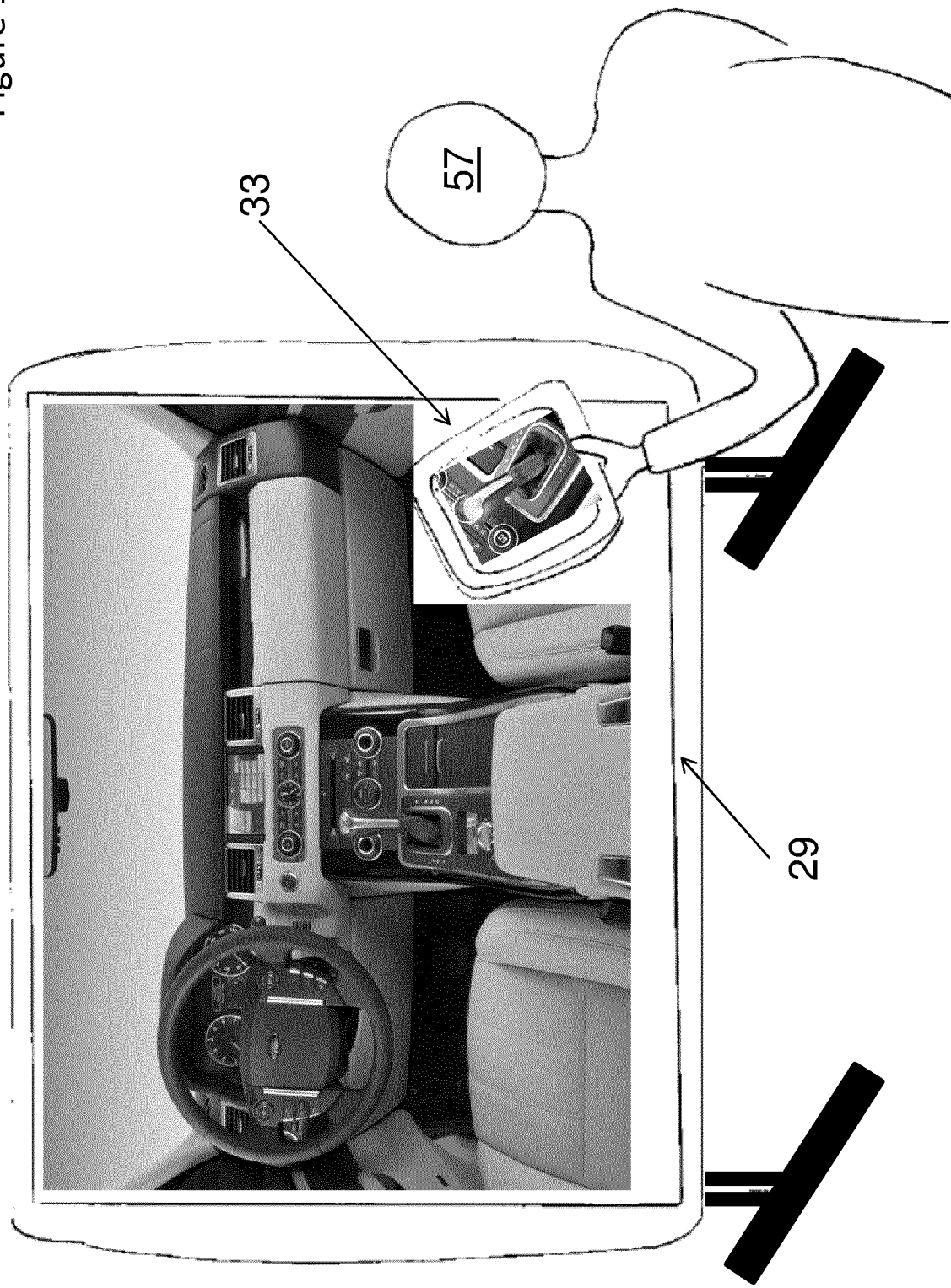


Figure 11

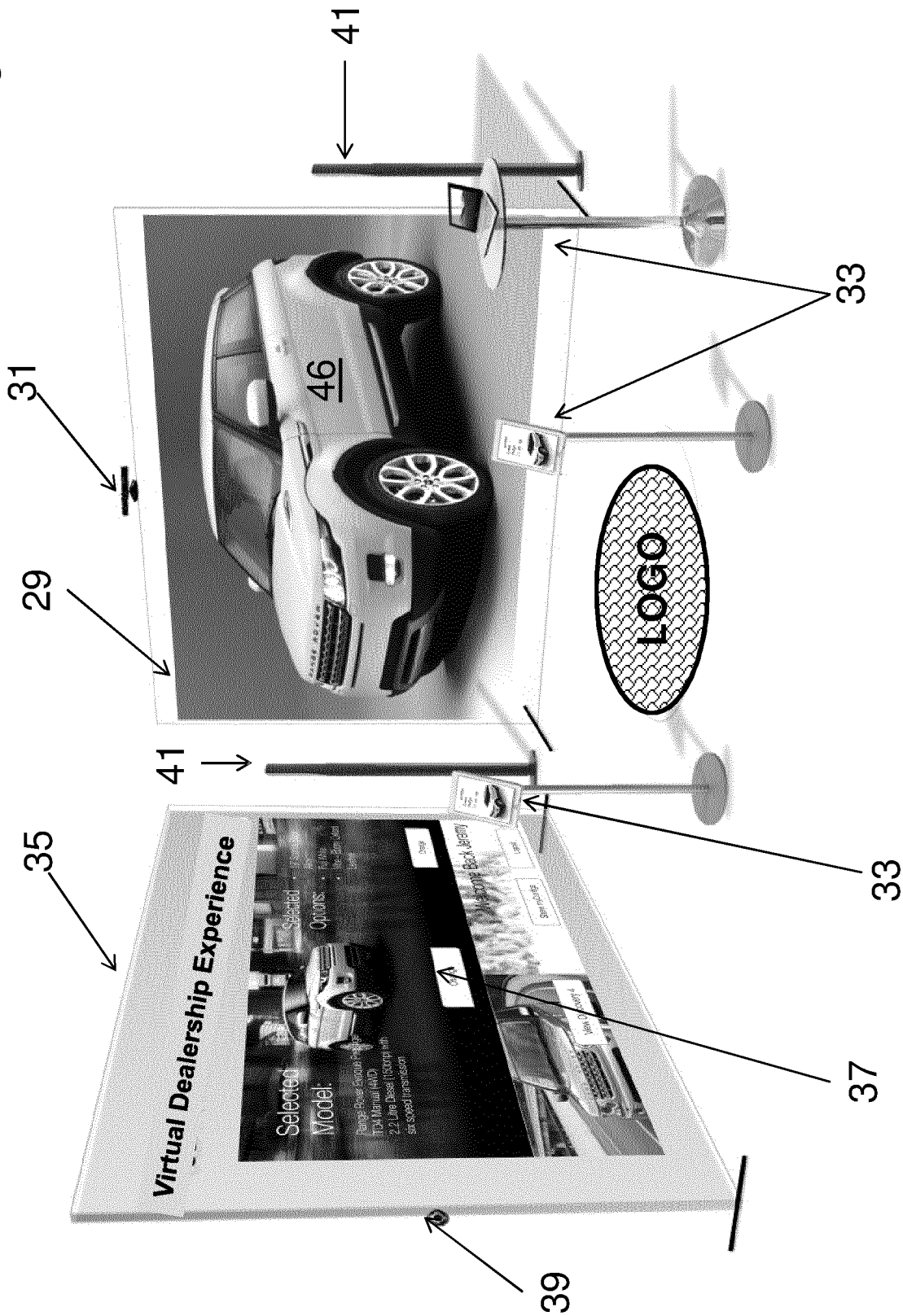
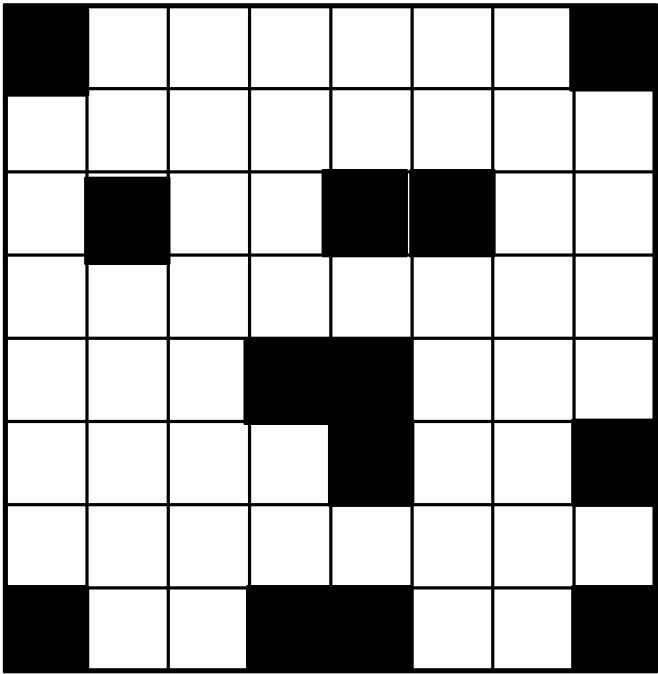


Figure 12



23

Figure 13

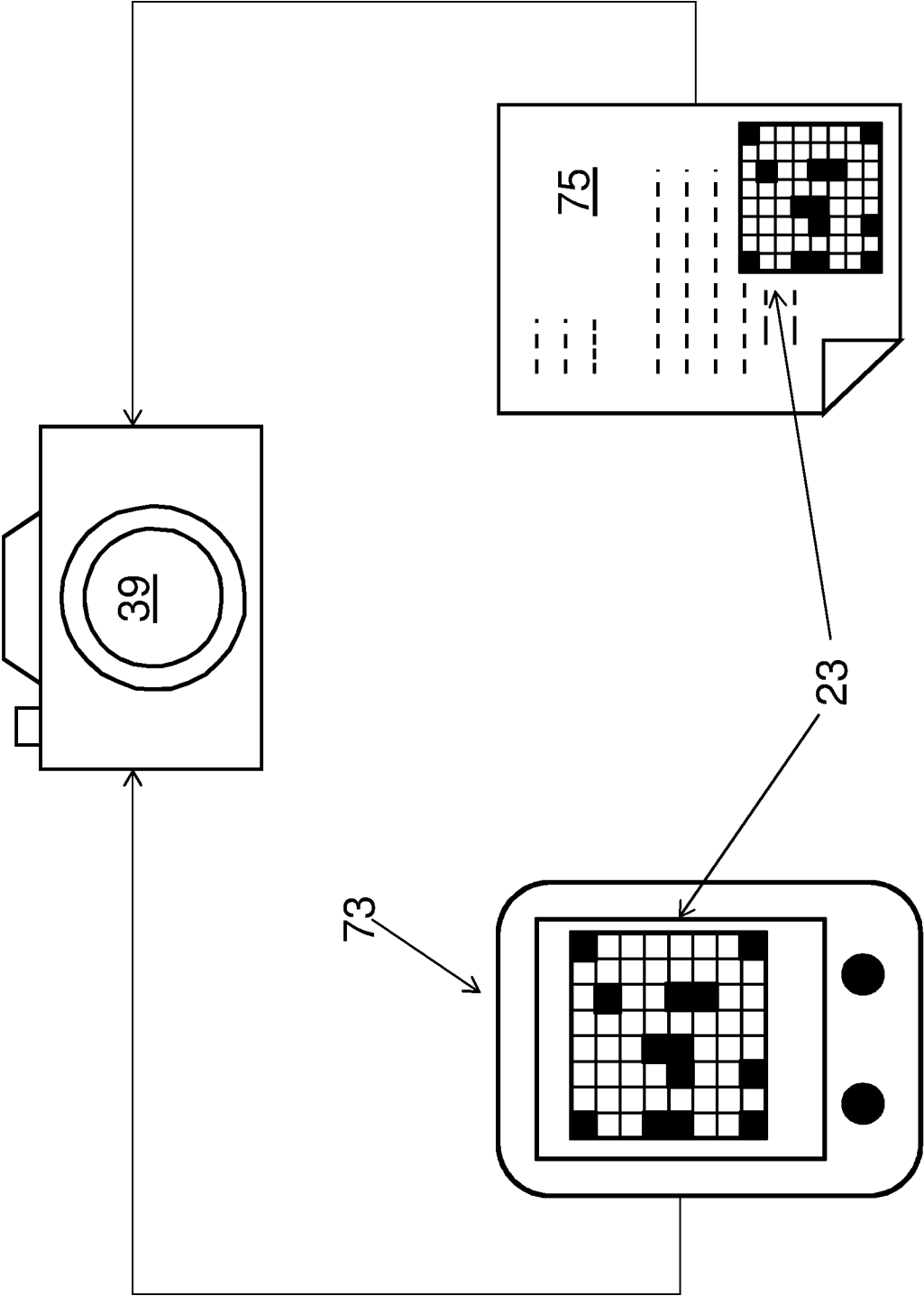
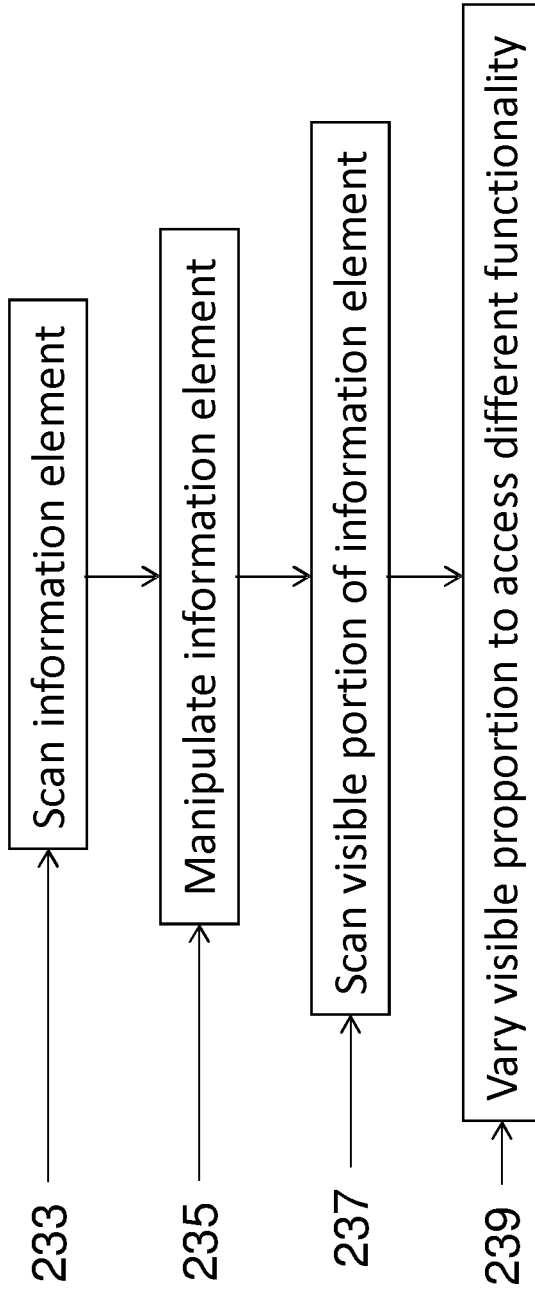


Figure 14



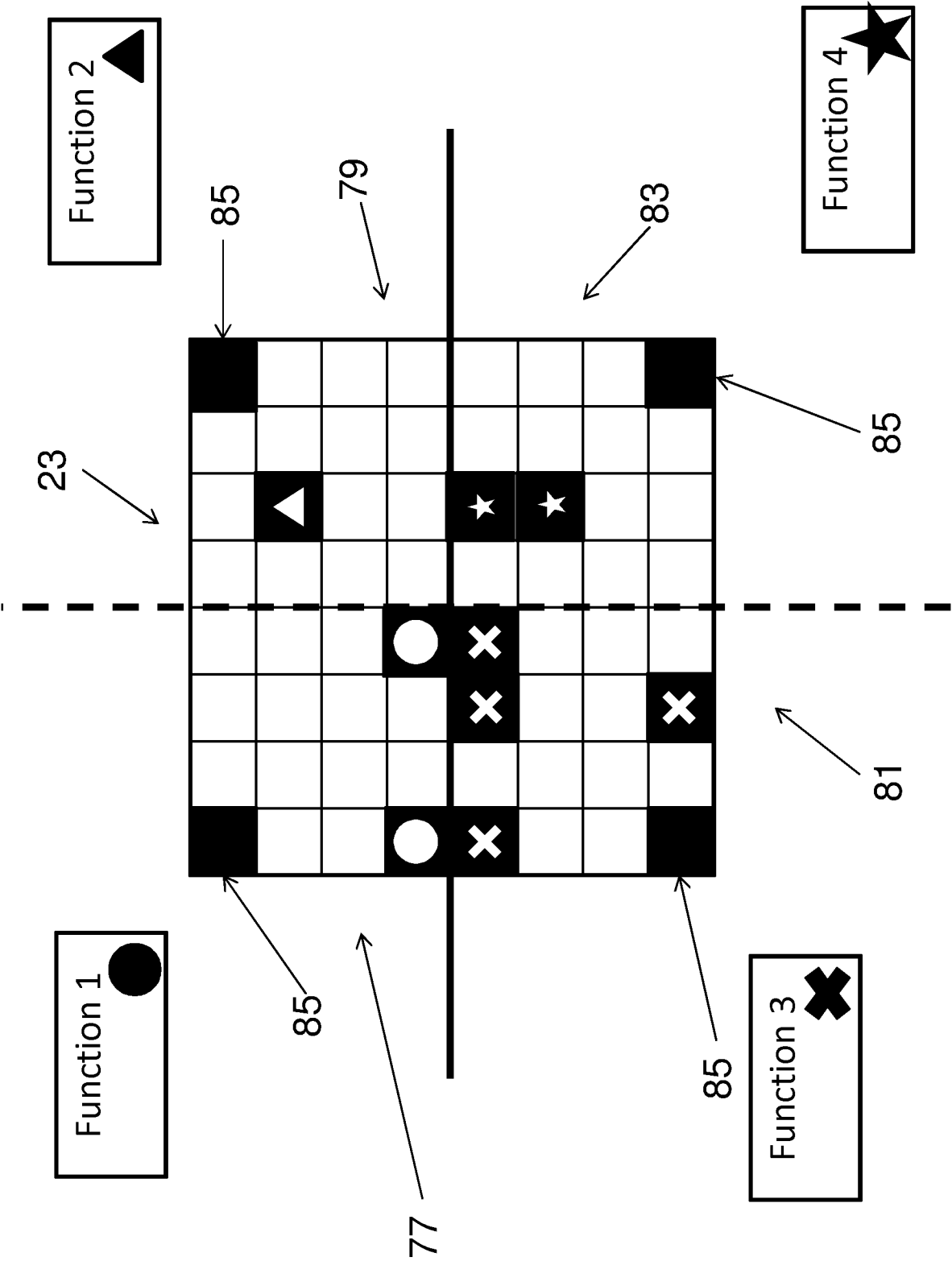


Figure 15

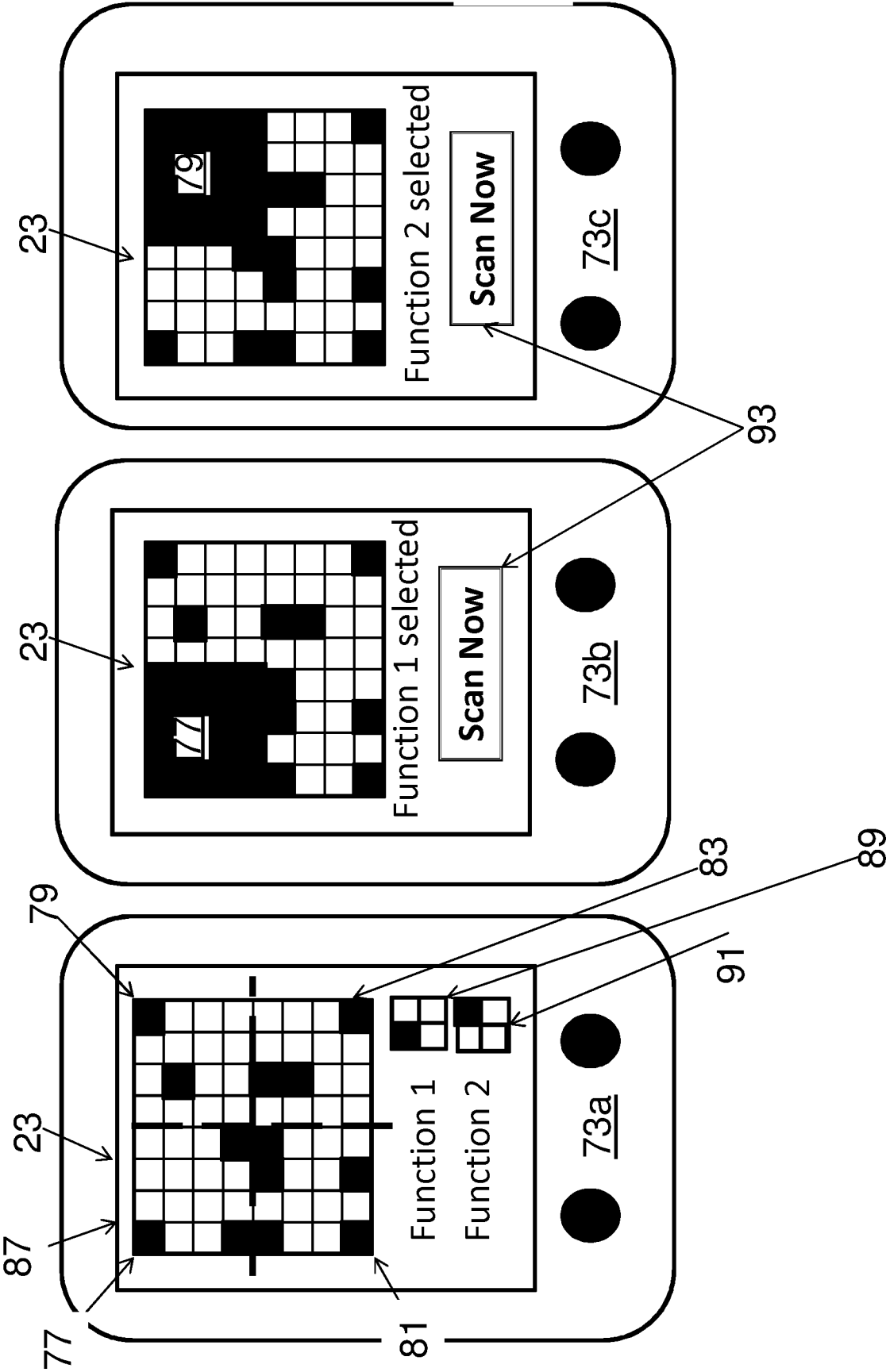


Figure 16

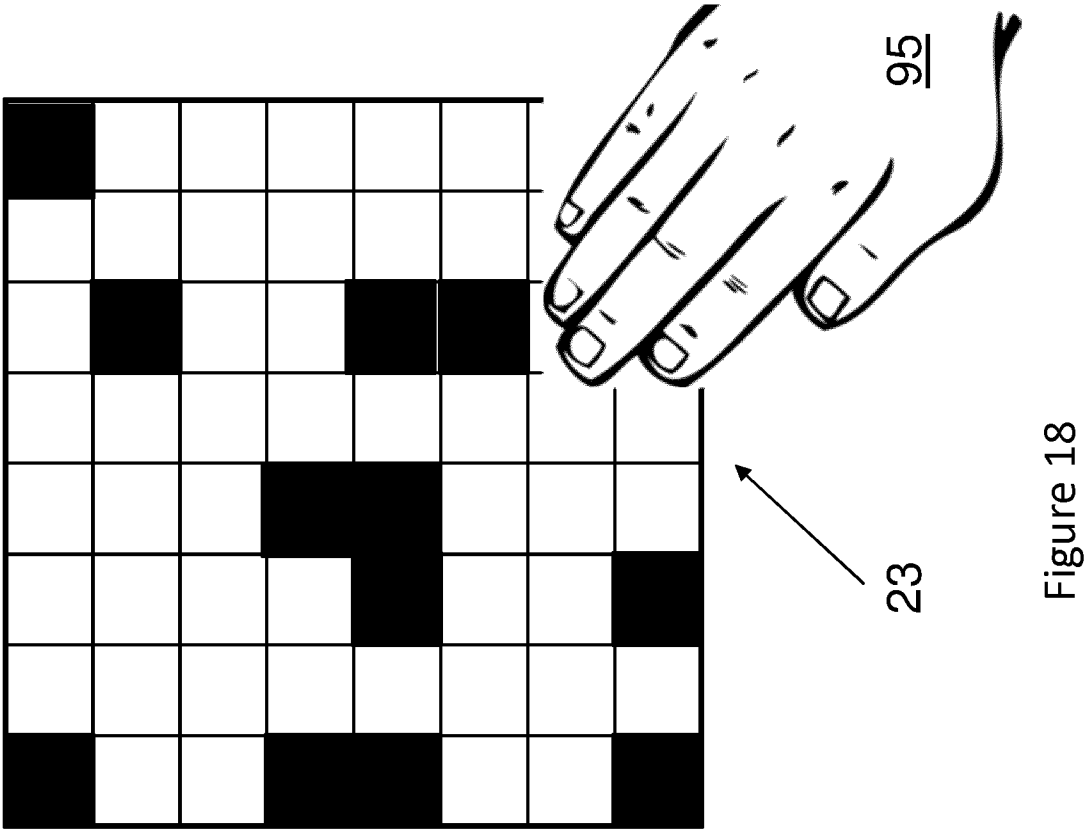


Figure 18

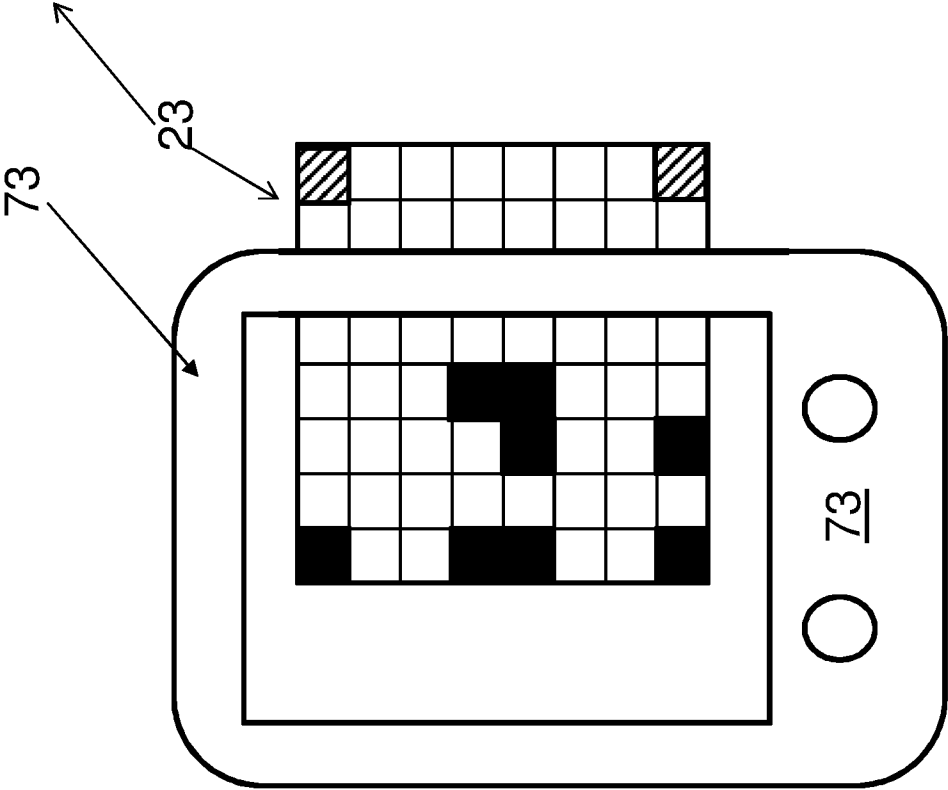


Figure 17

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2013/070004

A. CLASSIFICATION OF SUBJECT MATTER
INV. G06Q30/06
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
G06Q

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	KR 2012 0075512 A (KIM YONG SUNG [KR]) 9 July 2012 (2012-07-09) the whole document	1-27
X	US 2011/264552 A1 (SEERGY MICHAEL J [US] ET AL) 27 October 2011 (2011-10-27) the whole document	1-27
X	JP 2004 287976 A (SEIKO EPSON CORP) 14 October 2004 (2004-10-14) the whole document	1-27



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

2 December 2013

Date of mailing of the international search report

11/12/2013

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/EP2013/070004

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
KR 20120075512 A	09-07-2012	NONE	
US 2011264552 A1	27-10-2011	NONE	
JP 2004287976 A	14-10-2004	NONE	